TAPS · DIES
SCREW PLATES

CATALOG
35

S. W. CARD MFG. CO.
DIVISION OF UNION TWIST DRILL CO.
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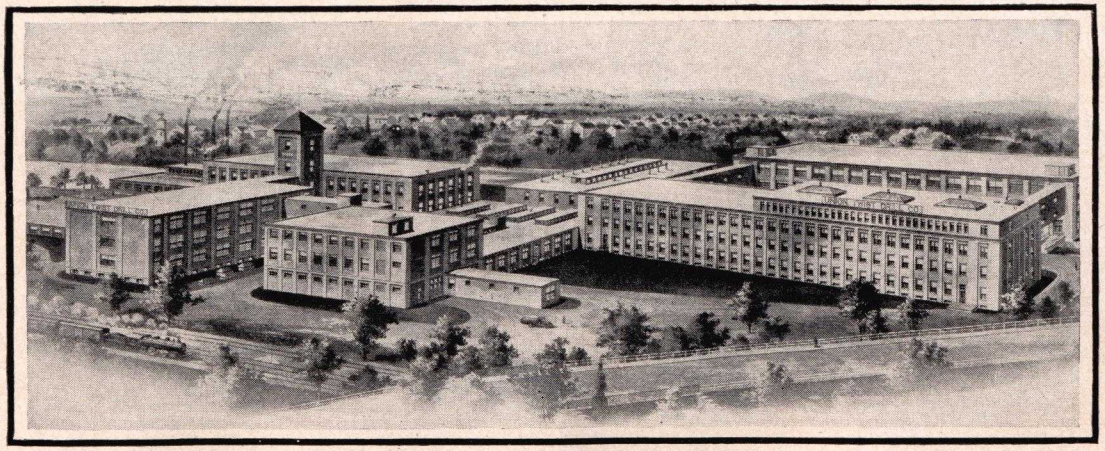
S. W. CARD MFG. CO.
DIVISION OF UNION TWIST DRILL CO.
Mansfield, Mass., U. S. A.



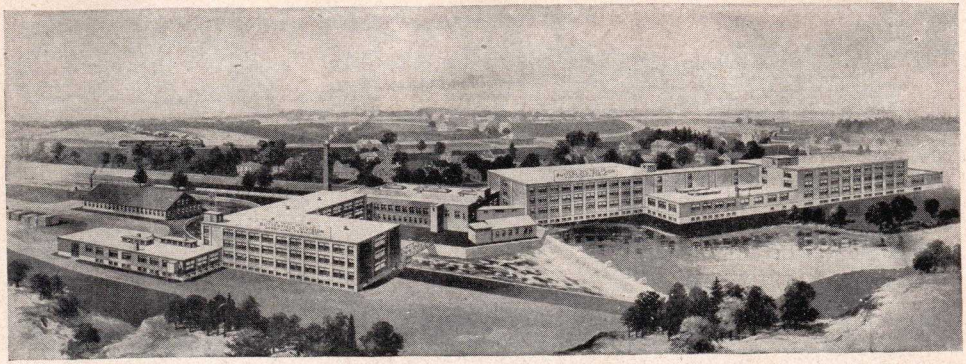
UNION TWIST DRILL COMPANY

Athol, Massachusetts, U. S. A.

SEVEN ACRES OF FLOOR SPACE

The Parent Company

Manufacturers of Drills, Reamers, Cutters and Hobs



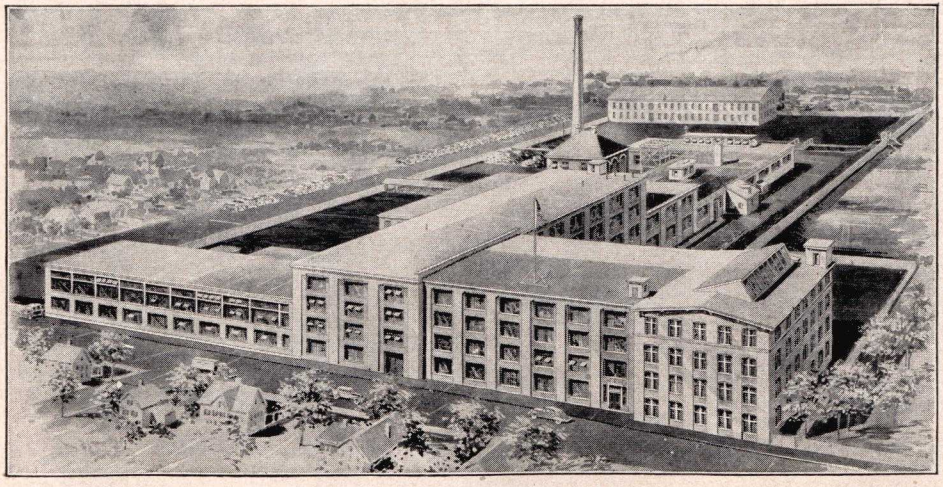
BUTTERFIELD DIVISIONS

FOUR AND THREE QUARTER ACRES OF FLOOR SPACE

Derby Line, Vermont; Rock Island, Quebec

United States Factory, Derby Line, Vermont. Manufacturers of Taps, Dies, Screw Plates, Blacksmith's and Die Stocks and Dies, Tap Wrenches and Reamers.

Canadian Factory, Rock Island, Quebec. Manufacturers of Twist Drills, Reamers, Milling Cutters, Hobs, Gear Cutters, Taps, Dies, Screw Plates, Blacksmith's and Pipe Stocks and Dies, Tap Wrenches.



S. W. CARD MFG. CO. DIVISION

Mansfield, Massachusetts

THREE ACRES OF FLOOR SPACE

Manufacturers of Taps, Dies, Screw Plates, Die Stocks and Tap Wrenches

S. W. CARD MFG. CO.

DIVISION UNION TWIST DRILL CO.

Established 1874—Incorporated 1894

Manufacturers of

TAPS, DIES, SCREW PLATES, DIE STOCKS and TAP WRENCHES

CATALOG NO. 35

January 1947

THIS CATALOG CANCELS ALL PREVIOUS EDITIONS

FACTORY AND OFFICE, MANSFIELD, MASS., U. S. A.

Complete Stocks Carried at

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DETROIT.....5527 Woodward Avenue
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NEW YORK.....61 Reade Street
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FOREWORD

THE S. W. CARD MFG. COMPANY, DIVISION OF THE UNION TWIST DRILL COMPANY, was established in 1874 for the manufacture of taps, dies, and screw plates. The corporation has specialized in the manufacture of these tools, devoting its entire attention to the development of plant, equipment, and organization capable of producing tools of good quality which have readily found markets in all parts of the world where tools are used.

No expense has been spared to keep both plant and equipment modern and capable of producing in quantity the accuracy and refinements in taps and dies that are in demand today. Most of the machine tool equipment, together with necessary jigs and fixtures, is special in character and is designed and built by ourselves.

A complete metallurgical department is maintained at the plant of the parent company, the Union Twist Drill Company at Athol, Massachusetts, under the direction of a well-known metallurgist. These facilities are at our command at all times to check raw materials and to establish heat treatments that have been found necessary to produce the best results. The heat treatment installations are all electrical with unit controls and represent the latest and most approved methods known to science today. These facilities, in the hands of men who have devoted years of effort and study to the heat treatment of various steels for diversified results, assure a quality and duplication in performance that is always within a very close range.

Inspection departments are provided with the best-known instruments to check heat treatment and to measure size, form, and lead. Recent additions in equipment and personnel have raised this department to a state of efficiency whereby the user is assured of receiving a quality of product that is in line with present-day demand for accuracy in dimension and efficiency in performance.

Our engineers and salesmen are men of wide experience in the manufacture and use of taps and dies. They are qualified to analyze your requirements and to make recommendations as to the tools best adapted to your particular needs. This service is at your disposal free of cost for betterments in both quality and quantity production.

CATALOG NO. 35

In the publication of this catalog, we have recognized the distinction between a textbook with lengthy descriptions bearing on the processing and technicalities of the product and a trade catalog used mainly for listing and pricing. Information bearing directly on standardization of design, dimensions, tolerances, drill sizes, etc., is supplied in detail and will be of great interest to the user.

MARKING

By turning to Table 301, you will observe the present standard system of marking taps to conform to the recommendations of the National Screw Thread Commission.

CLASSES AND STYLES OF TAPS

In cataloging the various classes, sizes, and designs of taps which can be purchased as regular, manufacturers are necessarily governed by the demand. When the sales of a particular item are large enough to manufacture in sufficient quantity, they can be considered regular and can be stocked and sold on that basis. Until that can be determined, such tools are made only on order and priced as special in line with quantity ordered at one time.

By intelligent selection, the user today can find listed as regular, taps that will meet a very large percentage of regular requirements thereby reducing to a minimum the necessity of ordering special taps at higher cost and subject to necessary delays in delivery.

There are four classes of taps from which selection can be made as follows:

Carbon Steel Cut Thread Taps
High Speed Steel Cut Thread Taps
High Speed Steel Commercial Ground Thread Taps
High Speed Steel Precision Ground Thread Taps

BOTH CARBON AND HIGH SPEED STEEL CUT THREAD TAPS are made to thread limits as shown in Table 325 and are capable of producing Class 2 N. S. T. C. fits under favorable conditions. The selection of carbon or high speed steel cut thread taps depends on the nature of the work and the expected results. Both are in large demand for a general line of tapping and high speed steel cut thread taps are extensively used where equipment and the nature of the work will permit fast speeds of operation.

HIGH SPEED STEEL GROUND THREAD TAPS

The high speed steel ground thread tap is now the accepted standard for accurate size and lead and is extensively used in high production. Our long experience in tap manufacture has made it possible to place on the market ground thread taps of the finest quality that will compare favorably with the best made from standpoints of accuracy and performance. They are made of selected high speed steel, ground all over after the hardening operation, and are high-grade precision tools. The demand has reached a point where the volume of sales is large and growing rapidly. This speaks well for the quality and general satisfaction these taps are delivering to the user.

Ground taps are made under two classifications—High Speed

Steel Commercial Ground and High Speed Steel Precision Ground Thread.

HIGH SPEED STEEL COMMERCIAL GROUND THREAD TAPS are made to smaller limits on the pitch diameter than cut thread taps and will more successfully produce Class 2 N. S. T. C. fits. They are made to thread limits as shown in Table 326. The shanks are ground concentric with the thread and in every way they are first-class precision taps. They are rapidly gaining favor and in most cases are replacing the precision ground thread taps.

HIGH SPEED STEEL PRECISION GROUND THREAD TAPS will in the majority of cases produce Class 3 N. S. T. C. fits when used under good conditions. The limits to which these taps are made are shown in Table 327. A wide selection of limits is provided whereby the user can procure the close fits needed at regular catalog prices. Where close tolerances must be maintained, precision ground thread taps should be specified. They are ground all over and represent the last word in accuracy in ground thread taps.

THE TAPPED HOLE

Owing to many variables not under the tap manufacturer's control which may affect fit, we wish to be clearly understood when we say we cannot guarantee the tapped hole. We guarantee the tap to be within the limits to which it is made. Our engineers will help you select the taps best suited for your work.

SPECIAL TAPS AND DIES

Taps and dies of special size and design are supplied to meet unusual conditions. In such cases, it is well to consider requirements in advance of immediate need and take advantage of lower prices based on quantities of a given size ordered at one time.

In manufacturing special tools to order, we find it advisable to start a few more through the factory than customer's order may specify to insure the completion of the full quantity.

It is our custom where a few more tools are furnished to include them in the shipment; likewise, if there is a small shortage, to consider the order completed.

SHIPMENTS

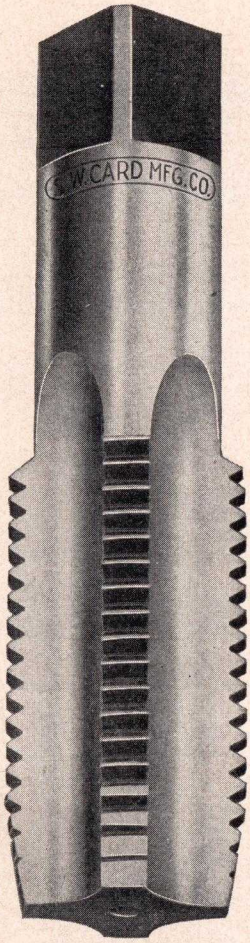
Domestic:—F. O. B. Mansfield, Mass. (Transportation allowances as arranged.)

Foreign:—F. O. B. Mansfield, Mass. (Transportation paid to Boston or New York.)

GUARANTEE

CARD QUALITY TOOLS are guaranteed against any defects in material or workmanship and we will replace free of charge any tools returned to our factory that we find to be imperfect.

Tap Section

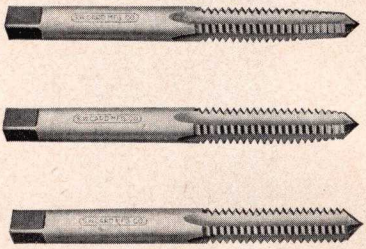


Standard Hand Taps

Under 1/4 Inch

Carbon Steel

List No. 1030



These taps are furnished with American National or Whitworth form of thread in taper, plug or bottoming style at regular prices.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 302
Limits: Table 325

Sizes and Prices

Diam. of Tap Inches	Price		Threads per Inch		Number of Flutes	Length Over-all Inches
	Each	Per Set	N. S.	Whitworth Std.		
1/16	$0.50	$1.50	64	60	3	1 5/8
3/32	.40	1.20	48	48	3	1 3/4
1/8	.35	1.05	40	40	3	1 15/16
5/32	.35	1.05	32, 36	32	4	2 1/16
3/16	.40	1.20	24, 32	24	4	2 3/8
7/32	.45	1.35	24, 32	24	4	2 3/8

Three Fluted Hand Taps

Carbon Steel

List No. 1032

These taps are furnished with American National form of thread in plug style only at regular prices.

Hand taps have shanks full diameter of thread.

Sizes and dimensions not listed are special.

Taper and bottoming taps are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 302
Limits: Table 325

Sizes and Prices

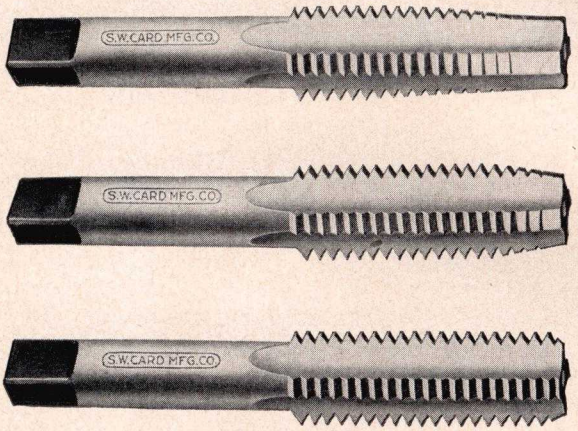
Diameter of Tap Inches	Price Each	Threads per Inch N. C.	Dimensions—Inches	
			Length of Thread	Length Overall
1/4	$.45	20	1	2 1/2
5/16	.50	18	1 1/8	2 23/32
3/8	.55	16	1 1/4	2 15/16

Standard Hand Taps

¼ Inch and Larger

Carbon Steel

List No. 1030



These taps are furnished with American National or Whitworth form of thread in taper, plug or bottoming style at regular prices.

Hand taps to and including ⅜ inch have shanks full diameter of thread. Taps 7/16 inch and larger have shanks smaller than the root diameter of the thread.

Unless otherwise specified, orders covering special Hand Taps 1⅛ inch to 1½ inch diameter inclusive, having 14 or more threads per inch, and sizes over 1½ inch diameter with 10 or more threads per inch, will be filled with taps having general dimensions as shown in Table 303.

Standard Hand Taps

¼ Inch and Larger

Carbon Steel

List No. 1030

For standard 14 and 18 m/m spark plug taps and other metric taps, see pages 17, 18 and 19.

Sizes and dimensions not listed are special.

Left hand taps are special.

For taps with three flutes see page 11.

For standard dimensions and limits see following tables:

Dimensions: Table 302 Regular
Table 303 Special Fine Pitch
Limits: Table 325

Sizes and Prices

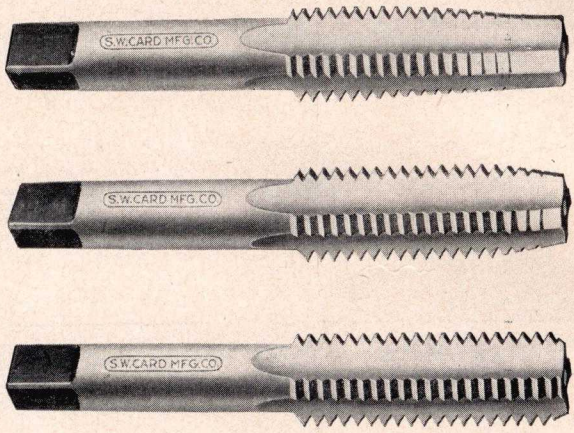
Diam. of Tap Inches	Price		Threads per Inch					Number of Flutes		Length Overall Inches
	Each	Per Set	N. C.	N. F.	N. S.	Whitworth Std.	Brit. Std. Fine	N. C.—N. S. Whit. & Brit. Std.	N. F.	
1/4	$0.45	$1.35	20	28	24, 32	20	26	4	4	2 1/2
5/16	.50	1.50	18	24	32	18	22	4	4	2 25/32
3/8	.55	1.65	16	24	..	16	20	4	4	2 15/16
7/16	.60	1.80	14	20	..	14	18	4	4	3 5/32
1/2	.70	2.10	13	20	..	12	16	4	4	3 3/8
9/16	.80	2.40	12	18	..	12	16	4	4	3 19/32
5/8	.90	2.70	11	18	..	11	14	4	4	3 13/16
11/16	1.05	3.15	..	..	11, 16	11	14	4	4	4 1/32
3/4	1.20	3.60	10	16	..	10	12	4	4	4 1/4
7/8	1.60	4.80	9	14	..	9	11	4	4	4 11/16
1	2.00	6.00	8	14	..	8	10	4	4	5 1/8
1 1/8	2.25	6.75	7	12	..	7	9	4	4	5 7/16
1 1/4	2.60	7.80	7	12	..	7	9	4	6	5 3/4
1 3/8	3.00	9.00	6	12	..	6	8	4	6	6 1/16
1 1/2	3.50	10.50	6	12	..	6	8	4	6	6 3/8
1 5/8	4.20	12.60	..	..	5 1/2	5	..	6	..	6 11/16
1 3/4	5.00	15.00	5	..	..	5	..	6	..	7
1 7/8	5.80	17.40	..	..	5	4 1/2	..	6	..	7 5/16
2	6.70	20.10	4 1/2	..	..	4 1/2	..	6	..	7 5/8

Standard Hand Taps

¼ Inch and Larger

High Speed Steel

List No. 1030



These taps are furnished with American National form of thread in taper, plug or bottoming style at regular prices.

Hand taps to and including ⅜ inch have shanks full diameter of thread. Taps 7/16 inch and larger have shanks smaller than the root diameter of the thread.

Unless otherwise specified, orders covering special Hand Taps 1⅛ inch to 1½ inch diameter inclusive, having 14 or more threads per inch, and sizes over 1½ inch diameter with 10 or more threads per inch, will be filled with taps having general dimensions as shown in Table 303.

Cut thread taps will be furnished unless ground thread are specified. Commercial ground thread taps will be furnished unless precision ground thread are specified. If precision ground thread taps are wanted, specify the limit number.

Standard Hand Taps

¼ Inch and Larger

High Speed Steel

List No. 1030

For standard 14 and 18 m/m spark plug taps and other metric taps, see pages 17, 18 and 19.

Precision ground thread hand taps not listed in Table 327 are special.

Sizes and dimensions not listed are special.

Left hand taps are special.

For taps with three flutes see page 16.

For standard dimensions and limits see following tables:

Dimensions: Table 302 Regular
Table 303 Special Fine Pitch

Limits: Table 325 Cut Thread
Table 326 Commercial Ground Thread
Table 327 Precision Ground Thread

Sizes and Prices

Diam. of Tap Inches	Price Each		Threads per Inch			No. of Flutes		Length Over-all Inches
	Cut Thread	Ground Thread	N. C.	N. F.	N. S.	N.C. and N. S.	N. F.	
1/4	$0.85	$0.85	20	28	..	4	4	2 1/2
5/16	.95	.95	18	24	..	4	4	2 23/32
3/8	1.10	1.10	16	24	..	4	4	2 15/16
7/16	1.30	1.30	14	20	..	4	4	3 5/32
1/2	1.55	1.55	13	20	..	4	4	3 3/8
9/16	1.85	1.85	12	18	..	4	4	3 19/32
5/8	2.20	2.20	11	18	..	4	4	3 13/16
11/16	2.60	2.60	..	..	11, 16	4	4	4 1/32
3/4	3.10	3.10	10	16	..	4	4	4 1/4
7/8	4.30	4.30	9	14	..	4	4	4 11/16
1	5.75	5.75	8	14	..	4	4	5 1/8
1 1/8	7.45	7.45	7	12	..	4	4	5 7/16
1 1/4	9.55	9.55	7	12	..	4	6	5 3/4
1 3/8	11.95	11.95	6	12	..	4	6	6 1/16
1 1/2	14.75	14.75	6	12	..	4	6	6 3/8

Three Fluted Hand Taps

High Speed Steel

List No. 1032

These taps are furnished with American National form of thread in plug or bottoming style only at regular prices.

Hand taps to and including 3/8 inch have shanks full diameter of thread. Taps 7/16 inch and larger have shanks smaller than the root diameter of the thread.

Cut thread taps will be furnished unless ground thread are specified. Commercial ground thread taps will be furnished unless precision ground thread are specified. If precision ground thread taps are wanted, specify the limit number.

Precision ground thread taps not listed in Table 327 are special.

Sizes and dimensions not listed are special.

Taper taps are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 302

Limits: Table 325 Cut Thread
Table 326 Commercial Ground Thread
Table 327 Precision Ground Thread

Sizes and Prices

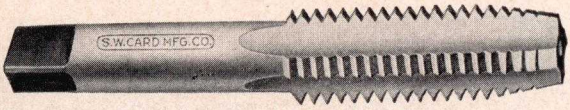
Diameter of Tap Inches	Price Each		Threads per Inch		Dimensions—Inches	
	Cut Thread	Ground Thread	N. C.	N. F.	Length of Thread	Length Overall
1/4	$0.85	$0.85	20	28	1	2 1/2
5/16	.95	.95	18	24	1 1/8	2 23/32
3/8	1.10	1.10	16	24	1 1/4	2 15/16
7/16	1.30	1.30	14	20	1 7/16	3 5/32
1/2	1.55	1.55	13	20	1 21/32	3 3/8

Standard Hand Taps

Metric Sizes

Carbon Steel

List No. 1030



These taps are furnished with the French or International form of thread in taper, plug or bottoming style at regular prices.

French Standard pitches, in sizes 2 m/m to 5.5 m/m inclusive, are those adopted by the French Navy, Department of War, Railway Companies, etc., and approved by the Society for the Advancement of National Industries.

International Standard pitches are the German extension of the Standard International System (S. I.) by the Deutsche Industry-Normen.

Taps to and including 8 m/m have shanks full diameter of thread.

Taps 9 m/m and larger have shanks smaller than root diameter of thread.

Sizes and dimensions not listed are special.

Left hand taps are special.

Sizes and Prices

Diam. of Tap m/m	Price		Pitch m/m			Dimensions—Inches			
	Each	Per Set	French Std.	International Std. (D. I. N.)	Also Furnished	Diam. of Shank	Size of Square	Length of Thread	Length Over-all
1.5	$0.50	$1.50	.35	...	...	.141	.110	5/16	1 5/8
2	.45	1.35	.45	.40	.50	.141	.110	7/16	1 3/4
2.3	.40	1.20	...	.40	...	.141	.110	1/2	1 13/16
2.5	.40	1.20	.45	...	...	.141	.110	1/2	1 13/16
2.6	.40	1.20	...	.45	...	.141	.110	9/16	1 7/8
3	.40	1.20	.60	.50	.75	.141	.110	5/8	1 15/16
3.5	.35	1.05	.60	.60	...	.141	.110	11/16	2
4	.35	1.05	.75	.70	...	.168	.131	3/4	2 1/8
4.5	.35	1.05	.75	.75	...	.194	.152	7/8	2 3/8
5	.40	1.20	.90	.80	.75, 1.00	.220	.165	15/16	2 3/8
5.5	.40	1.20	.90	.90	.75	.220	.165	15/16	2 3/8

Standard Hand Taps

Metric Sizes

Carbon Steel

List No. 1030

Diam. of Tap m/m	Price		Pitch m/m			Dimensions—Inches			
	Each	Per Set	French Std.	International Std. (D.I.N.)	Also Furnished	Diam. of Shank	Size of Square	Length of Thread	Length Over-all
6	$0.45	$1.35	1.00	1.00	1.25	.255	.191	1	2 1/2
7	.45	1.35	1.00	1.00	1.25	.318	.238	1 1/8	2 23/32
8	.50	1.50	1.00	1.25	....	.318	.238	1 1/8	2 23/32
9	.55	1.65	1.00	1.25	....	.275	.206	1 1/4	2 15/16
10	.55	1.65	1.50	1.50	1.25	.306	.229	1 1/4	2 15/16
11	.60	1.80	....	1.50	....	.323	.242	1 7/16	3 5/32
12	.70	2.10	1.50	1.75	1.25	.367	.275	1 21/32	3 3/8
13	.70	2.10	....	....	1.50, 1.75 2.00	.367	.275	1 21/32	3 3/8
*14	.80	2.40	2.00	2.00	1.25, 1.75	.429	.322	1 21/32	3 19/32
15	.80	2.40	....	....	1.75, 2.00	.480	.360	1 13/16	3 13/16
16	.90	2.70	2.00	2.00	....	.480	.360	1 13/16	3 13/16
17	1.05	3.15	....	....	2.00	.542	.406	1 13/16	4 1/32
*18	1.05	3.15	2.50	2.50	1.50, 2.00	.542	.406	1 13/16	4 1/32
19	1.20	3.60	....	....	2.50	.590	.442	2	4 1/4
20	1.40	4.20	2.50	2.50	2.00	.652	.489	2	4 15/32
22	1.60	4.80	2.50	2.50	....	.697	.523	2 7/32	4 11/16
24	1.80	5.40	3.00	3.00	....	.760	.570	2 7/32	4 29/32
26	2.00	6.00	3.00	....	....	.800	.600	2 1/2	5 1/8
27	2.25	6.75	....	3.00	....	.896	.672	2 9/16	5 7/16
28	2.25	6.75	3.00	....	....	.896	.672	2 9/16	5 7/16
30	2.60	7.80	3.50	3.50	....	.959	.719	2 9/16	5 7/16
32	2.60	7.80	3.50	....	....	1.021	.766	2 9/16	5 3/4
33	3.00	9.00	....	3.50	....	1.108	.831	3	6 1/16
34	3.00	9.00	3.50	....	....	1.108	.831	3	6 1/16
36	3.50	10.50	4.00	4.00	....	1.171	.878	3	6 1/16
38	3.50	10.50	4.00	....	....	1.233	.925	3	6 3/8
39	4.20	12.60	....	4.00	....	1.305	.979	3 3/16	6 11/16
40	4.20	12.60	4.00	....	....	1.305	.979	3 3/16	6 11/16
42	4.20	12.60	4.50	4.50	....	1.305	.979	3 3/16	6 11/16
44	5.00	15.00	4.50	....	....	1.430	1.072	3 3/16	7
45	5.00	15.00	....	4.50	....	1.430	1.072	3 3/16	7
46	5.80	17.40	4.50	....	....	1.519	1.139	3 9/16	7 5/16
48	5.80	17.40	5.00	5.00	....	1.519	1.139	3 9/16	7 5/16
50	6.70	20.10	5.00	....	....	1.644	1.233	3 9/16	7 5/8

*Spark Plug Taps 14 m/m—1.25 m/m pitch and 18 m/m—1.50 m/m pitch are made to the pitch diameter limits shown on page 19.

Standard Hand Taps

Metric Sizes

High Speed Steel

List No. 1030

These taps are furnished with the French or International form of thread in taper, plug or bottoming style at regular prices.

Cut thread taps will be furnished unless ground thread are specified.

Sizes and dimensions not listed are special.

Left hand taps are special.

For limits see tables below.

Sizes and Prices

Diam. of Tap m/m	Price Each		Pitch m/m	Dimensions—Inches			
	Cut Thread	Ground Thread		Diam. of Shank	Size of Square	Length of Thread	Length Over-all
14	$1.85	$1.85	1.25	.429	.322	$1\frac{21}{32}$	$3\frac{19}{32}$
18	3.10	3.10	1.50	.542	.406	$1\frac{13}{16}$	$4\frac{1}{32}$

Cut Thread Limits

Diam. m/m	Pitch m/m	Major Diameter			Pitch Diameter		
		Basic	Mini-mum	Maxi-mum	Basic	Mini-mum	Maxi-mum
14	1.25	.5512	.5544	.5574	.5192	.5197	.5217
18	1.50	.7087	.7126	.7166	.6703	.6708	.6733

Ground Thread Limits

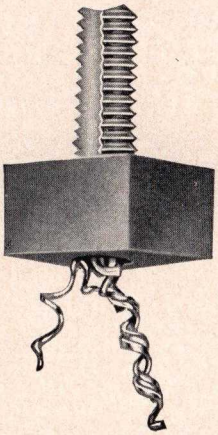
14	1.25	.5512	.5550	.5560	.5192	.5202	.5212
18	1.50	.7087	.7135	.7145	.6703	.6713	.6723

Spiral Pointed Taps

Three Fluted

Spiral pointed taps are designed for tapping deep through holes in all kinds of metals or in blind holes when drilled deeply enough to allow clearance for chips at bottom of hole.

The cutting is done by the first few threads which are milled at an angle to the axis of the tap. This, together with the extreme rake of the straight flutes, produces a long curling chip which is forced ahead of the tap, thus eliminating any chip clogging in the flutes. The cut shows the action of the chips.



The feature of forcing the chips ahead of the tap allows a shallow straight fluting, thereby increasing the strength of the tap and reducing breakage to a minimum.

The taps cut freely, produce excellent threads and have successfully tapped holes where two and sometimes three taps have been required.

When sharpening these taps care should be exercised to maintain the original form of the angular cutting edges. The spiral point should always extend beyond the first full thread.

See next page for sizes and prices of spiral pointed hand taps.

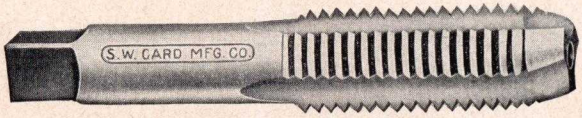
Spiral pointed machine screw taps are listed on pages 36 and 37.

Two Fluted

Spiral Pointed Hand Taps

Carbon Steel

List No. 1034



These taps are furnished with American National form of thread in plug style only at regular prices.

Spiral pointed hand taps to and including 3/8 inch have shanks full diameter of thread. Taps 7/16 inch and larger have shanks smaller than the root diameter of the thread.

Sizes and dimensions not listed are special.

Taper and bottoming taps are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 302
Limits: Table 325

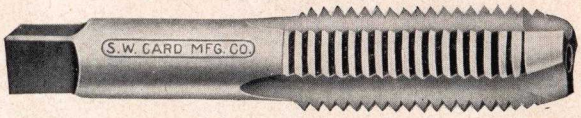
Sizes and Prices

Diam. of Tap Inches	Price Each	Threads per Inch			Number of Flutes	Length Over-all Inches
		N. C.	N. F.	N. S.		
1/8	$0.45	..	..	40	2	1 15/16
3/16	.50	..	..	24, 32	2	2 3/8
1/4	.55	20	28	..	2	2 1/2
5/16	.60	18	24	..	2	2 23/32
3/8	.70	16	24	..	3	2 15/16
7/16	.75	14	20	..	3	3 5/32
1/2	.85	13	20	..	3	3 3/8

Spiral Pointed Hand Taps

High Speed Steel

List No. 1034



These taps are furnished with American National form of thread in plug style only at regular prices.

Spiral pointed hand taps to and including 3/8 inch have shanks full diameter of thread. Taps 7/16 inch and larger have shanks smaller than the root diameter of the thread.

Cut thread taps will be furnished unless ground thread are specified. Commercial ground thread taps will be furnished unless precision ground thread are specified. If precision ground thread are wanted, specify the limit number.

Sizes and dimensions not listed are special.

Taper and bottoming taps are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 302
Limits: Table 325 Cut Thread
Table 326 Commercial Ground Thread
Table 327 Precision Ground Thread

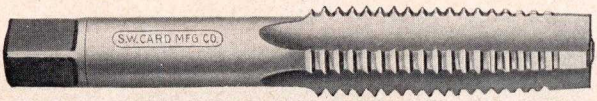
Sizes and Prices

Diam. of Tap Inches	Price Each		Threads per Inch		Number of Flutes	Length Overall Inches
	Cut Thread	Ground Thread	N. C.	N. F.		
1/4	$0.95	$0.95	20	28	2	2 1/2
5/16	1.05	1.05	18	24	2	2 23/32
3/8	1.25	1.25	16	24	3	2 15/16
7/16	1.45	1.45	14	20	3	3 5/32
1/2	1.70	1.70	13	20	3	3 3/8

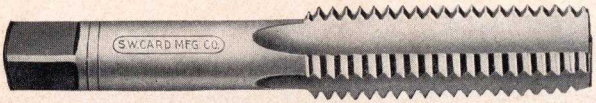
Serial Hand Taps

Carbon Steel

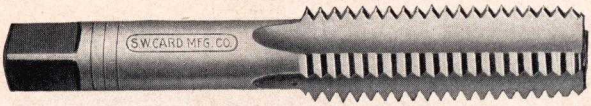
List No. 1038



No. 1 First Roughing



No. 2 Second Roughing



No. 3 Finishing

These taps are furnished with American National form of thread at regular prices.

Serial hand taps to and including 3/8 inch have shanks full diameter of thread. Taps 7/16 inch and larger have shanks smaller than the root diameter of the thread.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions see Table 302.

Sizes and Prices

Diameter of Tap Inches	Price		Threads per Inch N. C.	Number of Flutes	Length Overall Inches
	Each	Per Set			
1/4	$0.45	$1.35	20	4	2 1/2
5/16	.50	1.50	18	4	2 23/32
3/8	.55	1.65	16	4	2 15/16
7/16	.60	1.80	14	4	3 5/32
1/2	.70	2.10	13	4	3 3/8
9/16	.80	2.40	12	4	3 19/32
5/8	.90	2.70	11	4	3 13/16
3/4	1.20	3.60	10	4	4 1/4
7/8	1.60	4.80	9	4	4 11/16
1	2.00	6.00	8	4	5 1/8

Nut Taps

Carbon Steel

List No. 1040

These taps are furnished with American National or Whitworth form of thread at regular prices.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 306
Limits: Table 325

Sizes and Prices

Diam. of Tap Inches	Price Each	Threads per Inch			Number of Flutes	Length Over-all Inches
		N. C.	N. F.	Whitworth Std.		
1/4	$0.60	20	28	20	4	5
5/16	.70	18	24	18	4	5 1/2
3/8	.80	16	24	16	4	6
7/16	.90	14	20	14	4	6 1/2
1/2	1.00	13	20	12	4	7
9/16	1.15	12	18	12	4	7 1/2
5/8	1.35	11	18	11	4	8
3/4	1.85	10	16	10	4	9
7/8	2.45	9	14	9	4	10
1	3.15	8	14	8	4	11

Nut Taps

High Speed Steel

List No. 1040

These taps are furnished with American National form of thread.

Cut thread taps will be furnished unless ground thread are specified.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 306
Limits: Table 325 Cut Thread
Table 326 Ground Thread

Sizes and Prices

Diam. of Tap Inches	Price Each		Threads per Inch		Number of Flutes	Length Over-all Inches
	Cut Thread	Ground Thread	N. C.	N. F.		
1/4	$1.50	$1.50	20	28	4	5
5/16	1.70	1.70	18	24	4	5 1/2
3/8	2.00	2.00	16	24	4	6
7/16	2.40	2.40	14	20	4	6 1/2
1/2	2.70	2.70	13	20	4	7
9/16	3.35	3.35	12	18	4	7 1/2
5/8	4.05	4.05	11	18	4	8
3/4	5.65	5.65	10	16	4	9
7/8	7.90	7.90	9	14	4	10
1	10.55	10.55	8	14	4	11

Pulley Taps

Carbon Steel

List No. 1070

These taps are furnished with American National form of thread in plug style only at regular prices.

Sizes and dimensions not listed are special.

Taper and bottoming taps are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 310

Limits: Table 325

Sizes and Prices

Size of Tap		Price Each	Threads per Inch N. C.	Number of Flutes	Length of Thread Inches
Diam. Inches	Length Overall Inches				
1/4	6	$0.65	20	4	1
1/4	8	.70	20	4	1
5/16	6	.70	18	4	1 1/8
5/16	8	.75	18	4	1 1/8
3/8	6	.80	16	4	1 1/4
3/8	8	.85	16	4	1 1/4
3/8	10	.90	16	4	1 1/4
7/16	6	.85	14	4	1 7/16
7/16	8	.95	14	4	1 7/16
7/16	10	1.00	14	4	1 7/16
7/16	12	1.05	14	4	1 7/16
1/2	6	.95	13	4	1 21/32
1/2	8	1.05	13	4	1 21/32
1/2	10	1.10	13	4	1 21/32
1/2	12	1.15	13	4	1 21/32
5/8	6	1.10	11	4	1 13/16
5/8	8	1.35	11	4	1 13/16
5/8	10	1.40	11	4	1 13/16
5/8	12	1.50	11	4	1 13/16
5/8	14	1.65	11	4	1 13/16
3/4	10	1.85	10	4	2
3/4	12	1.95	10	4	2
3/4	14	2.00	10	4	2

Pulley Taps

High Speed Steel

List No. 1070

These taps are furnished with American National form of thread in plug style only at regular prices.

Cut thread taps will be furnished unless ground thread are specified.

Sizes and dimensions not listed are special.

Taper and bottoming taps are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 310

Limits: Table 325 Cut Thread
Table 326 Ground Thread

Sizes and Prices

Size of Tap		Price Each		Threads per Inch N. C.	Number of Flutes	Length of Thread Inches
Diam. Inches	Length Overall Inches	Cut Thread	Ground Thread			
1/4	6	$1.70	$1.70	20	4	1
1/4	8	2.25	2.25	20	4	1
5/16	6	1.70	1.70	18	4	1 1/8
5/16	8	2.30	2.30	18	4	1 1/8
3/8	6	2.00	2.00	16	4	1 1/4
3/8	8	2.60	2.60	16	4	1 1/4
3/8	10	3.20	3.20	16	4	1 1/4
7/16	6	2.10	2.10	14	4	1 7/16
7/16	8	2.75	2.75	14	4	1 7/16
7/16	10	3.50	3.50	14	4	1 7/16
7/16	12	4.10	4.10	14	4	1 7/16
1/2	6	2.25	2.25	13	4	1 21/32
1/2	8	3.10	3.10	13	4	1 21/32
1/2	10	3.75	3.75	13	4	1 21/32
1/2	12	4.40	4.40	13	4	1 21/32
5/8	6	2.90	2.90	11	4	1 13/16
5/8	8	4.10	4.10	11	4	1 13/16
5/8	10	5.00	5.00	11	4	1 13/16
5/8	12	5.80	5.80	11	4	1 13/16
5/8	14	6.60	6.60	11	4	1 13/16
3/4	10	6.10	6.10	10	4	2
3/4	12	7.10	7.10	10	4	2
3/4	14	8.10	8.10	10	4	2

Straight Shank Tapper Taps

Fractional Sizes

Carbon Steel

List No. 1080

These taps are furnished with American National or Whitworth form of thread and plain round shanks at regular prices.

When so specified tapper taps will be furnished with any of the following standard shanks at an additional charge based on the quantity ordered.

Squared
Acme Type "C"
National Interchangeable Ring Lock

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions and limits see following tables:
Dimensions: Tables 307 and 308
Limits: Table 325

Sizes and Prices

Diam. of Tap Inches	Length Overall Price Each		Threads per Inch			Number of Flutes
	12 Inches	15 Inches	N. C.	N. F.	Whitworth Std.	
1/4	$0.75	.....	20	28	20	3
5/16	.85	.....	18	24	18	3
3/8	.95	.....	16	24	16	3
7/16	1.05	.....	14	20	14	3
1/2	1.15	$1.35	13	20	12	3
9/16	1.35	1.55	12	18	12	4
5/8	1.50	1.75	11	18	11	4
3/4	1.95	2.10	10	16	10	4
7/8	2.50	2.75	9	14	9	4
1	3.30	3.65	8	14	8	4
1 1/8	.....	4.15	7	12	7	4
1 1/4	.....	5.10	7	12	7	4
1 3/8	.....	6.00	6	12	6	4
1 1/2	.....	7.35	6	12	6	4

Straight Shank Tapper Taps

Fractional Sizes

High Speed Steel

List No. 1080

These taps are furnished with American National form of thread and plain round shanks at regular prices.

When so specified tapper taps will be furnished with any of the following standard shanks at an additional charge based on the quantity ordered.

Squared
Acme Type "C"
National Interchangeable Ring Lock

Cut thread taps will be furnished unless ground thread are specified.

Sizes and dimensions not listed are special.

Left hand taps are special.

For dimensions and limits see following tables:

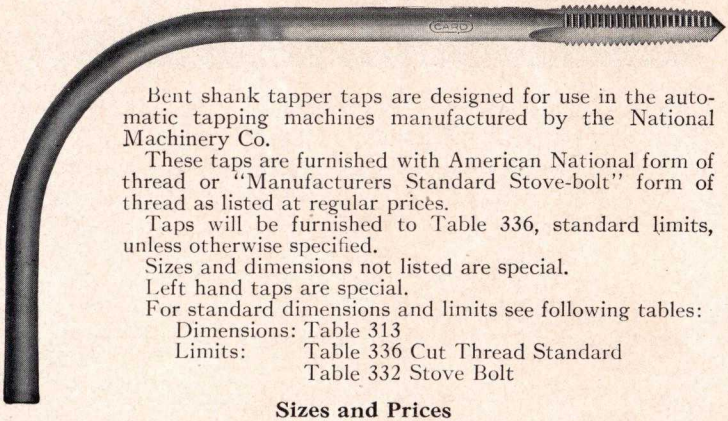
Dimensions: Tables 307 and 308
Limits: Table 325 Cut Thread
Table 326 Ground Thread

Sizes and Prices

Diam. of Tap Inches	Length Overall Price Each				Threads per Inch		Number of Flutes
	12 Inches		15 Inches		N. C.	N. F.	
	Cut Thread	Ground Thread	Cut Thread	Ground Thread			
1/4	$3.25	$3.25	....	....	20	28	3
5/16	3.35	3.35	....	....	18	24	3
3/8	3.80	3.80	....	....	16	24	3
7/16	4.10	4.10	....	....	14	20	3
1/2	4.40	4.40	$5.30	$5.30	13	20	3
9/16	5.00	5.00	6.20	6.20	12	18	4
5/8	5.80	5.80	7.00	7.00	11	18	4
3/4	7.10	7.10	8.60	8.60	10	16	4
7/8	9.20	9.20	11.15	11.15	9	14	4
1	11.30	11.30	13.55	13.55	8	14	4

Bent Shank Tapper Taps

Fractional Sizes
Carbon Steel
List No. 1082



Bent shank tapper taps are designed for use in the automatic tapping machines manufactured by the National Machinery Co.

These taps are furnished with American National form of thread or "Manufacturers Standard Stove-bolt" form of thread as listed at regular prices.

Taps will be furnished to Table 336, standard limits, unless otherwise specified.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 313
Limits: Table 336 Cut Thread Standard
Table 332 Stove Bolt

Sizes and Prices

Diam. of Tap Inches	Size of Machine	Price Each	Threads per Inch			Number of Flutes	Length Overall Inches Before Bending Including Point
			N. C.	N. F.	Stove Bolt Std.		
3/16	3/16"	$0.60	..	..	24	3	4 15/16
1/8	1/4"	.65	40	..	..	3	6 1/2
3/16	1/4"	.65	24	32	24	3	6 1/2
1/4	1/4"	.65	20	28	18	3	6 1/2
5/16	1/4"	.75	18	24	..	3	6 1/2
1/4	3/8"	.70	20	28	..	3	8 3/4
5/16	3/8"	.80	18	24	..	3	8 3/4
3/8	3/8"	.90	16	24	..	3	8 3/4
3/8	1/2"	.95	16	24	..	3	12
7/16	1/2"	1.05	14	20	..	3	12
1/2	1/2"	1.15	13	20	..	3	12
9/16	5/8"	1.55	12	18	..	3	15
5/8	5/8"	1.75	11	18	..	3	15
3/4	5/8"	2.10	*10	16	..	3	15

*Recommended only for thin nuts.

Straight Shank Tapper Taps

Machine Screw Sizes

Carbon Steel

List No. 1084

These taps are furnished with American National form of thread and plain round shanks at regular prices.

Sizes and dimensions not listed are special

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 309
Limits: Table 328

Sizes and Prices

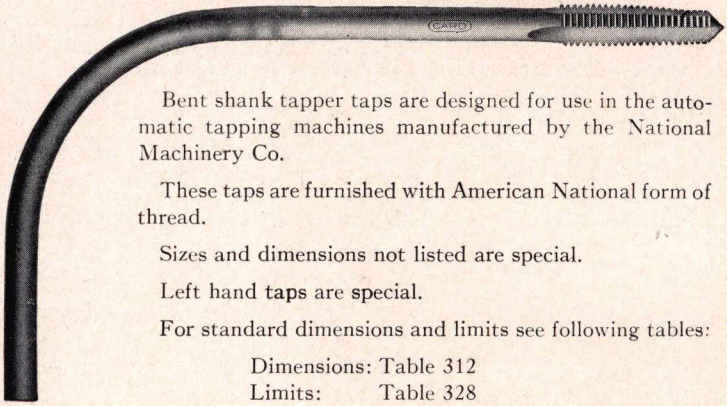
Screw Gauge No.	Basic Major Diam. Inches	Price Each	Threads per Inch			Number of Flutes	Length Over-all Inches
			N. C.	N. F.	N. S.		
4	.112	$0.70	..	..	36	3	6
4	.112	.70	40	..	..	3	6
4	.112	.70	..	48	..	3	6
5	.125	.70	40	..	..	3	8
5	.125	.70	..	44	..	3	8
6	.138	.70	32	..	..	3	8
6	.138	.70	..	40	..	3	8
8	.164	.70	32	..	..	3	9
8	.164	.70	..	36	..	3	9
10	.190	.70	24	..	..	3	11
10	.190	.70	..	32	..	3	11
12	.216	.70	24	..	..	3	11
12	.216	.70	..	28	..	3	11

Bent Shank Tapper Taps

Machine Screw Sizes

Carbon Steel

List No. 1086



Bent shank tapper taps are designed for use in the automatic tapping machines manufactured by the National Machinery Co.

These taps are furnished with American National form of thread.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 312
Limits: Table 328

Sizes and Prices

Screw Gauge No.	Basic Outside Diam. Inches	Size of Machine	Price Each	Threads per Inch			Number of Flutes	Length Over-all Inches Before Bending Including Point
				N. C.	N. F.	N. S.		
4	.112	1/8"	$0.60	40	48	36	3	3 9/16
5	.125	1/8"	.60	40	44	..	3	3 9/16
6	.138	1/8"	.60	32	40	..	3	3 9/16
6	.138	3/16"	.60	32	40	..	3	4 15/16
8	.164	3/16"	.60	32	36	..	3	4 15/16
10	.190	3/16"	.60	24	32	..	3	4 15/16
12	.216	3/16"	.60	24	28	..	3	4 15/16
6	.138	1/4"	.65	32	40	..	3	6 1/2
8	.164	1/4"	.65	32	36	..	3	6 1/2
10	.190	1/4"	.65	24	32	..	3	6 1/2
12	.216	1/4"	.65	24	28	..	3	6 1/2
14	.242	1/4"	.65	..	..	20	3	6 1/2
14	.242	1/4"	.65	..	..	24	3	6 1/2

Stove Bolt Taps

Carbon Steel

List No. 1100

These taps are furnished with "Manufacturers Standard" form of thread in plug style only at regular prices.

Sizes and dimensions not listed are special.

Taper and bottoming taps are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 305
Limits: Table 332

Sizes and Prices

Diam. of Tap Inches	Price Each	Threads per Inch	Number of Flutes	Length Overall Inches
3/16	$0.40	24	4	2 3/8
1/4	.45	18	4	2 1/2
5/16	.50	18	4	2 23/32

British Association Hand Taps

Carbon Steel

List No. 1110

These taps are furnished with the British Association form of thread in taper, plug or bottoming style at regular prices.

Sizes and Prices

No.	Price Each	Diam. m/m	Pitch m/m	No.	Price Each	Diam. m/m	Pitch m/m
0	$0.35	6.0	1.00	7	$0.35	2.5	.48
1	.35	5.3	.90	8	.35	2.2	.43
2	.35	4.7	.81	9	.40	1.9	.39
3	.35	4.1	.73	10	.45	1.7	.35
4	.35	3.6	.66	11	.50	1.5	.31
5	.35	3.2	.59	12	.50	1.3	.28
6	.35	2.8	.53	14	.60	1.0	.23

Standard Machine Screw Taps

Carbon Steel

List No. 1120

These taps are furnished with American National form of thread and standard number of flutes in taper, plug or bottoming style at regular prices.

When these taps are specified with an optional number of flutes as listed, they will be furnished in plug style only at regular prices.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 304
Limits: Table 328

Sizes and Prices

Screw Gauge No.	Basic Major Diam. Inches	Price Each	Threads per Inch			Number of Flutes		Length Overall Inches
			N. C.	N. F.	N. S.	Standard	Optional	
0	.060	$0.50	..	80	..	2	..	1 5/8
1	.073	.50	64	72	56	2	..	1 11/16
2	.086	.45	56	64	..	3	..	1 3/4
3	.099	.40	48	56	..	3	..	1 13/16
4	.112	.40	40	48	32, 36	3	..	1 7/8
5	.125	.35	40	44	..	3	..	1 15/16
6	.138	.35	32	40	36	3	..	2
8	.164	.35	32	36	40	4	..	2 1/8
8	.164	.35	32	..	..	..	3	2 1/8
10	.190	.40	24	32	30	4	..	2 3/8
10	.190	.40	24	32	..	..	3	2 3/8
12	.216	.45	24	28	32	4	..	2 3/8
14	.242	.45	..	..	20, 24	4	..	2 1/2

Standard Machine Screw Taps

High Speed Steel

List No. 1120

These taps are furnished with American National form of thread and standard number of flutes in taper, plug or bottoming style at regular prices.

When these taps are specified with an optional number of flutes as listed, they will be furnished in plug or bottoming style only at regular prices.

Cut thread taps will be furnished unless ground thread are specified. Commercial ground thread will be furnished unless precision ground thread are specified.

Precision ground thread taps are furnished in National Coarse and National Fine only. The pitch diameter limits are from basic to basic plus .0005 inch.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 304
Limits: Table 328 Cut Thread
Table 329 Commercial Ground Thread

Sizes and Prices

Screw Gauge No.	Basic Major Diam. Inches	Price Each			Threads per Inch			Number of Flutes		Length Over-all Inches
		Cut Thread	Commercial Ground Thread	Precision Ground Thread	N. C.	N. F.	N. S.	Standard	Optional	
0	.060	.....	.....	$2.40	..	80	..	2	..	1 5/8
1	.073	.....	.....	2.20	64	72	..	2	..	1 11/16
2	.086	.....	.....	2.05	56	64	..	3	2	1 3/4
3	.099	$0.85	$0.85	1.50	48	56	..	3	2	1 13/16
4	.112	.70	.70	1.30	40	48	36	3	2	1 7/8
5	.125	.70	.70	1.30	40	44	..	3	2	1 15/16
6	.138	.70	.70	1.30	32	40	..	3	2	2
8	.164	.70	.70	1.30	32	36	..	4	2, 3	2 1/8
10	.190	.75	.75	1.35	24	32	..	4	2, 3	2 3/8
12	.216	.80	.80	1.40	24	28	..	4	..	2 3/8
14	.242	.85	.85	.....	..	..	20, 24	4	..	2 1/2

Spiral Pointed Machine Screw Taps

Carbon Steel

List No. 1122

These taps are furnished with American National form of thread in plug style only at regular prices.

Sizes and dimensions not listed are special.

Taper and bottoming taps are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 304

Limits: Table 328

Sizes and Prices

Screw Gauge No.	Basic Major Diam. Inches	Price Each	Threads per Inch			Number of Flutes	Length Over-all Inches
			N. C.	N. F.	N. S.		
3	.099	$0.60	48	56	..	2	1 13/16
4	.112	.50	40	48	36	2	1 7/8
5	.125	.45	40	44	..	2	1 15/16
6	.138	.45	32	40	..	2	2
8	.164	.45	32	36	..	2	2 1/8
10	.190	.50	24	32	..	2	2 3/8
12	.216	.55	24	28	..	2	2 3/8
14	.242	.55	..	..	20, 24	2	2 1/2

Spiral Pointed Machine Screw Taps

High Speed Steel

List No. 1122

These taps are furnished with American National form of thread in plug style only at regular prices.

Cut thread taps will be furnished unless ground thread are specified. Commercial ground thread taps will be furnished unless precision ground thread are specified.

Precision ground thread taps are furnished in National Coarse and National Fine only. The pitch diameter limits are from basic to basic plus .0005 inch.

Sizes and dimensions not listed are special.

Taper and bottoming taps are special.

Left hand taps are special.

For standard dimensions and limits see following tables:
Dimensions: Table 304
Limits: Table 328 Cut Thread
Table 329 Commercial Ground Thread

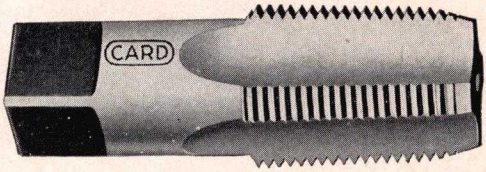
Sizes and Prices

Screw Gauge No.	Basic Major Diam. Inches	Price Each			Threads per Inch			Number of Flutes	Length Overall Inches
		Cut Thread	Commercial Ground Thread	Precision Ground Thread	N. C.	N. F.	N. S.		
3	.099	$0.95	$0.95	$1.60	48	56	..	2	1 13/16
4	.112	.80	.80	1.40	40	48	36	2	1 7/8
5	.125	.80	.80	1.40	40	44	..	2	1 15/16
6	.138	.80	.80	1.40	32	40	..	2	2
8	.164	.80	.80	1.40	32	36	..	2	2 1/8
10	.190	.85	.85	1.45	24	32	..	2	2 3/8
12	.216	.90	.90	1.50	24	28	..	2	2 3/8
14	.242	.95	.95	.....	..	..	20, 24	2	2 1/2

Taper Pipe Taps

Carbon Steel

List No. 1140



These taps are furnished with American Standard Pipe or British Standard Pipe form of thread at regular prices.

Unless otherwise specified orders for 1/8 inch pipe taps will be filled with taps having the large shank.

American Standard Form taper pipe taps with right or left hand thread will be furnished at standard list prices but subject to different discounts.

Left hand pipe taps with British Standard thread are special.

Sizes and dimensions not listed are special.

For standard dimensions and limits see following tables:

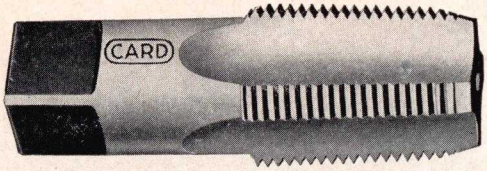
Dimensions: Table 311
Limits: Table 338

Sizes and Prices

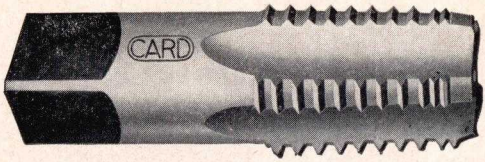
Nominal Size Inches	Price Each		Threads per Inch		Number of Flutes	Length Overall
	American Standard Pipe	British Standard Pipe	American Standard	British Standard		
1/8	$1.00	$1.00	27	28	4	2 1/8
1/4	1.20	1.20	18	19	4	2 7/16
3/8	1.60	1.60	18	19	4	2 9/16
1/2	2.00	2.00	14	14	4	3 1/8
3/4	2.80	2.80	14	14	5	3 1/4
1	4.40	4.40	11 1/2	11	5	3 3/4
1 1/4	5.00	5.00	11 1/2	11	5	4
1 1/2	6.60	6.60	11 1/2	11	6	4 1/4
2	10.00	10.00	11 1/2	11	6	4 1/2
2 1/2	15.00	15.00	8	11	8	5 1/2
3	22.50	22.50	8	11	8	6
3 1/2	30.00	30.00	8	11	9	6 1/2
4	45.00	45.00	8	11	9	6 3/4

Taper Pipe Taps

High Speed Steel



Taper List No. 1140



Interrupted List No. 1144

These taps are furnished with American Standard Pipe form of thread.

Unless otherwise specified orders for 1/8 inch pipe taps will be filled with taps having the large shank.

Cut thread taps will be furnished unless ground thread are specified.

The first few threads on an interrupted thread pipe tap are left full.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 311 Limits: Table 338

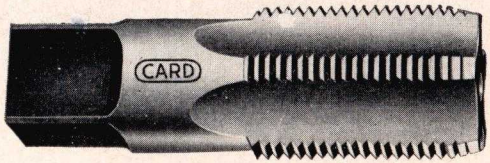
Sizes and Prices

Nominal Size Inches	Price Each			Threads per Inch	Number of Flutes		Length Overall Inches
	Cut Thread		Ground Thread				
	Regular	Interrupted	Regular		Regular	Interrupted	
1/8	$1.60	$2.00	$1.60	27	4	5	2 1/8
1/4	1.80	2.20	1.80	18	4	5	2 7/16
3/8	2.30	2.80	2.30	18	4	5	2 9/16
1/2	4.40	5.25	4.40	14	4	5	3 1/8
3/4	6.10	7.30	6.10	14	5	5	3 1/4
1	9.20	11.10	9.20	11 1/2	5	5	3 3/4
1 1/4	13.10	15.75	13.10	11 1/2	5	5	4
1 1/2	17.70	21.25	17.70	11 1/2	6	7	4 1/4
2	24.00	28.80	24.00	11 1/2	6	7	4 1/2

Straight Pipe Taps

Carbon Steel

List No. 1141



These taps are furnished with American Standard Pipe or British Standard Pipe form of thread in plug style only at regular prices.

Unless otherwise specified orders for 1/8 inch pipe taps will be filled with taps having the large shank.

American Standard Form cut thread straight pipe taps are made from under to over basic, as shown in Table 334, to permit a taper pipe gage to enter up to the notch. Therefore, a basic straight pipe gage will not always enter a threaded hole tapped with a cut thread straight pipe tap.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 311
Limits: Table 334

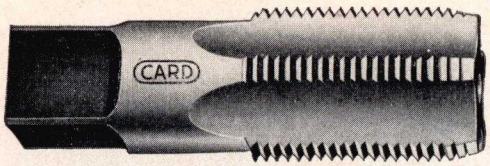
Sizes and Prices

Nominal Size Inches	Price Each		Threads per Inch		Number of Flutes	Length Overall
	American Standard	British Standard	American Standard	British Standard		
1/8	$1.00	$1.00	27	28	4	2 1/8
1/8	1.00	1.00	27	28	4	2 1/8
1/4	1.20	1.20	18	19	4	2 7/16
3/8	1.60	1.60	18	19	4	2 9/16
1/2	2.00	2.00	14	14	4	3 1/8
3/4	2.80	2.80	14	14	5	3 1/4
1	4.40	4.40	11 1/2	11	5	3 3/4
1 1/4	5.00	5.00	11 1/2	11	5	4
1 1/2	6.60	6.60	11 1/2	11	6	4 1/4
2	10.00	10.00	11 1/2	11	6	4 1/2

Straight Pipe Taps

High Speed Steel

List No. 1141



These taps are furnished with American Standard Pipe form of thread in plug style only at regular prices.

Unless otherwise specified orders for ⅛ inch pipe taps will be filled with taps having the large shank.

Cut thread taps will be furnished unless ground thread are specified.

American Standard Form cut thread straight pipe taps are made from under to over basic, as shown in Table 334, to permit a taper pipe gage to enter up to the notch. Therefore, a basic straight pipe gage will not always enter a threaded hole tapped with a cut thread straight pipe tap.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 311
Limits: Table 334 Cut Thread
Table 335 Ground Thread

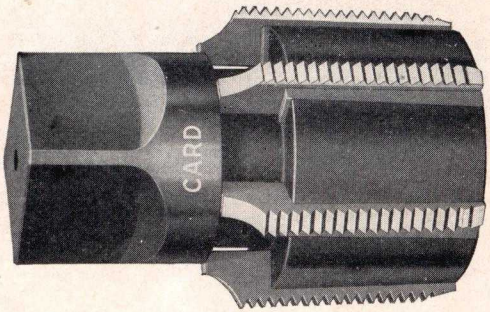
Sizes and Prices

Nominal Size Inches	Price Each		Threads per Inch	Number of Flutes	Length Overall
	Cut Thread	Ground Thread			
⅛	$1.60	$1.60	27	4	2⅛
⅛	1.60	1.60	27	4	2⅛
¼	1.80	1.80	18	4	2 7/16
⅜	2.30	2.30	18	4	2 9/16
½	4.40	4.40	14	4	3⅛
¾	6.10	6.10	14	5	3¼
1	9.20	9.20	11½	5	3¾

Inserted Chaser Taper Pipe Taps

Carbon and High Speed Steel

List No. 1145



These taps are furnished with American Standard Pipe form of thread at regular prices.

Inserted Chaser straight pipe taps and taps with British Standard form of thread are special.

Sizes and dimensions not listed are special.

Left hand taps are special.

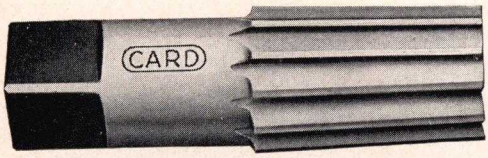
Sizes and Prices

Nominal Size Inches	Price of Complete Tap Cut Thread		Threads Per Inch	Length Thread Inches	Length Overall Inches	Number of Chasers to a Set	Price of Chasers per Set Cut Thread	
	Carbon Steel	High Speed Steel					Carbon Steel	High Speed Steel
1½	$20.00	$26.00	11½	2⅛	4¼	4	$6.00	$12.00
2	20.00	26.00	11½	2⅛	4¼	4	6.00	12.00
2½	23.00	32.00	8	2½	5	6	9.00	18.00
3	30.00	40.00	8	2½	5	6	10.00	20.00
3½	40.00	50.00	8	2⅝	5½	6	10.00	20.00
4	50.00	60.00	8	2⅝	5½	6	10.00	20.00
4½	60.00	70.00	8	2¾	6	6	10.00	20.00
5	75.00	90.00	8	2¾	6	8	15.00	30.00
6	95.00	110.00	8	2¾	6½	8	15.00	30.00

Pipe Reamers

Carbon and High Speed Steel

List No. 1160



These reamers are tapered ¾ of an inch to the foot and are intended for reaming holes to be tapped with either American Standard or British Standard taper pipe taps listed on pages 38 and 39.

Sizes and dimensions not listed are special.

Sizes and Prices

Nominal Size Inches	Price Each		Dimensions—Inches					
	Carbon Steel	High Speed Steel	Diam. Large End	Diam. Small End	Length of Flutes	Diam. of Shank	Size of Square	Length Over-all
⅛	$1.00	$3.50	.362	.316	¾	.4375	.328	2⅛
¼	1.20	4.00	.472	.406	1 1/16	.5625	.421	2 7/16
⅜	1.60	4.25	.606	.540	1 1/16	.7000	.531	2 9/16
½	2.00	5.50	.751	.665	1⅜	.6875	.515	3⅛
¾	2.80	7.50	.962	.876	1⅜	.9063	.679	3¼
1	4.40	11.50	1.212	1.103	1¾	1.1250	.843	3¾
1¼	5.00	19.50	1.553	1.444	1¾	1.3125	.984	4
1½	6.60	25.00	1.793	1.684	1¾	1.5000	1.125	4¼
2	10.00	33.00	2.268	2.159	1¾	1.8750	1.406	4½

Staybolt Taps

Carbon Steel

List No. 1130

Features of Interest in the Manufacture of Staybolt Taps

Design

Taps are fluted sufficient depth and with the right circle of undercut to the threaded sections to give a shearing effect to the cut and eliminate any chip clogging.

The taper threads are cut below the root to eliminate reaming and both taper and straight threads are properly relieved.

The points are chamfered and will readily enter the second sheet.

Steel

A special analysis steel is used in the manufacture of staybolt taps that will stand hard motor driving and reduce breakage to a minimum.

Heat Treatment

In the heat treatment of staybolt taps great care is exercised to hold to close tolerances in size and lead. The depth of temper provides a soft center or core in the tap, adding greatly to the strength and efficiency of the tool.

Detailed specifications and list prices on next page.

Staybolt Taps

Carbon Steel

List No. 1130

These taps are furnished with American National or V form of thread at regular prices.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 314
Limits: Table 333

Sizes and Prices

Diam. of Tap Inches	Price Each		Threads per Inch	Number of Flutes
	Of Tap 24″ Long	Of Tap 27″ Long		
7/8	$10.80	$12.15	12	5
15/16	12.00	13.50	12	5
1	13.20	14.85	12	5
1 1/16	14.40	16.20	12	5
1 1/8	15.60	17.55	12	5
1 3/16	16.80	18.90	12	5
1 1/4	18.00	20.25	12	5
1 5/16	19.20	21.60	12	5
1 3/8	20.40	22.95	12	5
1 7/16	21.60	24.30	12	5
1 1/2	22.80	25.65	12	5

Staybolt Taps

High Speed Steel

List No. 1130

These taps are furnished with American National or V form of thread at regular prices.

American National form of thread furnished unless otherwise specified.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard dimensions and limits see following tables:

Dimensions: Table 314
Limits: Table 333

Sizes and Prices

Diam. of Tap Inches	Price Each of Tap 24" Long Cut Thread	Threads per Inch	Number of Flutes
7/8	$20.00	12	5
15/16	20.00	12	5
1	20.00	12	5
1 1/16	20.00	12	5
1 1/8	22.00	12	5
1 3/16	24.00	12	5
1 1/4	26.00	12	5

Spindle Staybolt Taps

Carbon Steel

List No. 1134

These taps are furnished with American National or V form of thread at regular prices.

American National form of thread furnished unless otherwise specified.

Sizes and dimensions not listed are special.

Left hand taps are special.

Standard spindle staybolt taps have the following dimensions:

Length of Fluted Thread	4″
Length of Unfluted Thread	6″
Length of Square	1″
Length Overall	12″
Diameter of Spindle	3/8″
Length of Spindle	15 3/8″

For standard limits see Table 333.

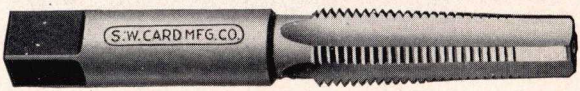
Sizes and Prices

Diam. of Tap Inches	Price Each	Threads per Inch	Number of Flutes	Dimensions—Inches	
				Diam. of Shank	Size of Square
7/8	$13.20	12	5	1.000	3/4
15/16	13.80	12	5	1.000	3/4
1	14.40	12	5	1.000	3/4
1 1/16	15.00	12	5	1.000	3/4
1 1/8	15.60	12	5	1.000	3/4
1 3/16	16.20	12	5	1.062	3/4
1 1/4	16.80	12	5	1.125	3/4
1 5/16	17.40	12	5	1.187	3/4
1 3/8	18.00	12	5	1.250	1
1 7/16	18.60	12	5	1.312	1
1 1/2	19.20	12	5	1.375	1

Straight Boiler Taps

Carbon Steel

List No. 1171



These taps are furnished with American National or V form of thread at regular prices.

American National form of thread furnished unless otherwise specified.

Sizes and dimensions not listed are special.

Left hand taps are special.

For standard limits, see Table 333.

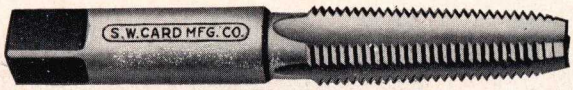
Sizes and Prices

Diam. of Tap Inches	Price Each	Threads per Inch	Number of Flutes	Dimensions—Inches			
				Diam. of Shank	Size of Square	Length of Thread	Length Over-all
1/2	$1.05	12	4	.5000	.375	2	4 1/4
9/16	1.25	12	4	.5625	.421	2 1/8	4 5/8
5/8	1.40	12	4	.6250	.468	2 1/4	5
11/16	1.60	12	4	.6875	.515	2 3/8	5 1/4
3/4	1.95	12	4	.7500	.562	2 1/2	5 1/2
13/16	2.25	12	4	.8125	.609	2 11/16	5 3/4
7/8	2.50	12	4	.8750	.656	2 7/8	6
15/16	2.80	12	4	.9375	.702	3	6 1/4
1	3.35	12	4	1.0000	.750	3 3/16	6 1/2
1 1/16	3.50	12	4	1.0625	.796	3 3/8	6 3/4
1 1/8	3.65	12	4	1.1250	.843	3 7/16	6 7/8
1 3/16	3.85	12	4	1.1875	.890	3 1/2	7
1 1/4	4.05	12	6	1.2500	.937	3 9/16	7 1/8
1 5/16	4.35	12	6	1.3125	.984	3 5/8	7 1/4
1 3/8	4.70	12	6	1.3750	1.031	3 3/4	7 3/8
1 7/16	5.30	12	6	1.4375	1.078	3 7/8	7 1/2
1 1/2	5.50	12	6	1.5000	1.125	4	7 5/8

Taper Boiler Taps

Carbon Steel

List No. 1172



These taps are furnished with American National or V form of thread at regular prices.

American National form of thread furnished unless otherwise specified.

Taper boiler taps have a taper of 3/4 inch to the foot and the diameter is measured 5/8 inch from the large end of the thread.

Sizes and dimensions not listed are special.

Left hand taps are special.

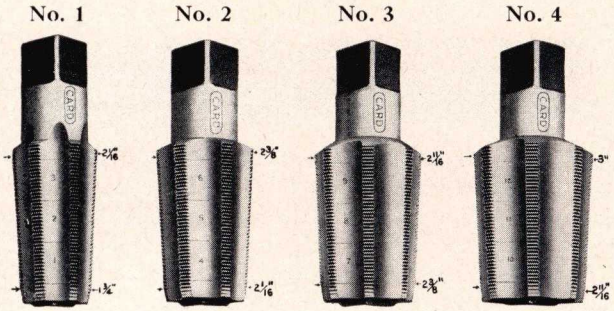
Sizes and Prices

Diam. of Tap Inches	Price Each	Threads per Inch	Number of Flutes	Dimensions—Inches			
				Diam. of Shank	Size of Square	Length of Thread	Length Over-all
1/2	$1.05	12	4	.5000	.375	2 1/4	4 1/4
9/16	1.25	12	4	.5625	.421	2 3/8	4 5/8
5/8	1.40	12	4	.6250	.468	2 1/2	5
11/16	1.60	12	4	.6875	.515	2 5/8	5 1/4
3/4	1.95	12	4	.7500	.562	2 3/4	5 1/2
13/16	2.25	12	4	.8125	.609	2 3/4	5 3/4
7/8	2.50	12	4	.8750	.656	2 3/4	6
15/16	2.80	12	4	.9375	.702	2 3/4	6 1/4
1	3.35	12	4	1.0000	.750	2 3/4	6 1/2
1 1/16	3.50	12	4	1.0625	.796	2 3/4	6 3/4
1 1/8	3.65	12	4	1.1250	.843	2 3/4	6 7/8
1 3/16	3.85	12	4	1.1875	.890	2 3/4	7
1 1/4	4.05	12	5	1.2500	.937	2 13/16	7 1/8
1 5/16	4.35	12	5	1.3125	.984	2 7/8	7 1/4
1 3/8	4.70	12	5	1.3750	1.031	2 15/16	7 3/8
1 7/16	5.30	12	5	1.4375	1.078	3	7 1/2
1 1/2	5.50	12	5	1.5000	1.125	3	7 5/8

Mud or Washout Taps

Carbon Steel

List No. 1173



These taps are furnished with American National or V form of thread at regular prices.

American National form of thread furnished unless otherwise specified.

Mud or Washout taps are regularly furnished with a taper of 1¼ inches to the foot and are marked to correspond with taper plugs bearing the same numbers.

Sizes and dimensions not listed are special.

Left hand taps are special.

Sizes and Prices

Number	Price Each	Threads per Inch	Number of Flutes	Diam. Inches		Dimensions—Inches			
				Small End	Large End	Diam. of Shank	Size of Square	Length of Thread	Length Over-all
1	$7.60	12	6	1 3/4	2 1/16	2	1 1/2	3 5/8	6 1/2
2	9.50	12	6	2 1/16	2 3/8	2	1 1/2	3 5/8	6 1/2
3	12.50	12	8	2 3/8	2 11/16	2	1 1/2	3 5/8	6 1/2
4	14.45	12	8	2 11/16	3	2	1 1/2	3 5/8	6 1/2
5	18.35	12	8	3	3 5/16	3	1 7/8	3 5/8	6 1/2

Tap Wrenches

List No. 210

These tap wrenches are light but very strong. The jaws are made of tool steel correctly tempered to give long service. A complete range of sizes to meet your requirements.

Number	Length Inches	Holding Taps	Complete Price Each	Extra Jaws Price per Pair
0	5	1/16 to 3/16	$ 1.50	$0.50
8	7	1/16 to 1/4	2.00	.60
9	10 1/2	3/16 to 1/2	3.50	.75
10	15	1/4 to 3/4	4.00	1.25
11	20	3/8 to 1	5.00	1.50
12	25	1/2 to 1 1/4	8.00	2.00
14	30	5/8 to 1 1/2	12.00	2.50

Center Reamers

List No. 903

Fluted Type

These reamers are regularly furnished with sixty degree inclusive angle in carbon or high speed steel.

Reamers with eighty-two degree inclusive angle will be furnished at regular prices when specified.

Sizes and dimensions not listed are special.

Sizes and Prices

Size Cut Inches	Price Each		Dimensions—Inches		
	Carbon Steel	High Speed Steel	Diameter of Shank	Length of Shank	Length Overall (Approximate)
1/4	$0.40	$1.00	3/16	3/4	1 1/2
3/8	.45	1.15	1/4	7/8	1 3/4
1/2	.55	1.40	3/8	1	2
5/8	.70	1.75	3/8	1	2 1/4
3/4	.85	2.15	1/2	1 1/4	2 5/8

Die Section

Adjustable Round Split Dies

Carbon Steel

List No. 804

Outside Diameter 5/8 Inch, Thickness 1/4 Inch

List No. 805

Outside Diameter 13/16 Inch, Thickness 1/4 Inch

Outside Diameter 1 Inch, Thickness 3/8 Inch

These dies are furnished with American National form of thread.

Sizes and dimensions not listed are special.

Left hand dies are special.

For standard chamfer see Table 360.

Sizes and Prices

Screw Gauge No.	Basic Outside Diam. Inches	Outside Diameter Price Each			Threads per Inch		
		5/8 Inch	13/16 Inch	1 Inch	N.C.	N. F.	N.S.
0	.060	$0.80	$0.90	....	..	80	..
1	.073	.80	.90	....	64	72	56
2	.086	.70	.80	....	56	64	..
3	.099	.60	.70	....	48	56	..
4	.112	.50	.60	....	40	48	32, 36
5	.125	.50	.60	....	40	44	..
6	.138	.50	.60	$0.75	32	40	36
8	.164	.50	.60	.75	32	36	40
10	.190	.50	.60	.75	24	32	30
12	.216	.50	.60	.75	24	28	32
14	.242	.50	.60	.75	..	..	20, 24

Adjustable Round Split Dies

Fractional Sizes

Carbon Steel

List No. 805

Outside Diameter 13/16 Inch, Thickness 1/4 Inch
Outside Diameter 1 Inch, Thickness 3/8 Inch

Carbon steel dies are furnished with American National or Whitworth form of thread at regular prices.

Wherever possible the substitution of Machine Screw Sizes is recommended for sizes smaller than 1/4 inch diameter.

Sizes and dimensions not listed are special.

Left hand dies are special.

For standard chamfer see Table 360.

Sizes and Prices

Cutting Size Inches	Outside Diameter Price Each		Threads per Inch				
	13/16 Inch	1 Inch	N. C.	N. F.	N. S.	Whitworth Standard	British Standard Fine
1/16	$0.90	....	..	..	64	60	..
3/32	.70	....	..	..	48	48	..
1/8	.60	$0.75	..	..	40	40	..
5/32	.60	.75	..	..	32, 36	32	..
3/16	.60	.75	..	..	24, 32	24	..
7/32	.60	.75	..	..	24, 32	24	..
1/4	.60	.75	20	28	24, 32	20	26
5/16	.60	.75	18	24	32	18	22
3/8	....	.75	16	24	..	16	20
7/16	....	.75	14	20	..	14	18

Adjustable Round Split Dies

Fractional Sizes

Carbon Steel

List No. 805

Outside Diameter 1 5/16 Inch, Thickness 7/16 Inch

Outside Diameter 1½ Inch, Thickness ½ Inch

Outside Diameter 2 Inch, Thickness 5/8 Inch

Carbon steel dies are furnished with American National or Whitworth form of thread at regular prices.

Sizes and dimensions not listed are special.

Left hand dies are special.

For standard chamfer see Table 360.

Sizes and Prices

Cutting Size Inches	Outside Diameter Price Each			Threads per Inch				
	1 5/16 Inch	1½ Inch	2 Inch	N. C.	N. F.	N. S.	Whitworth Std.	British Std. Fine
1/4	$1.25	$1.25	$2.00	20	28	24, 32	20	26
5/16	1.25	1.25	2.00	18	24	32	18	22
3/8	1.25	1.25	2.00	16	24	..	16	20
7/16	1.25	1.25	2.00	14	20	..	14	18
1/2	1.25	1.25	2.00	13	20	..	12	16
9/16	....	1.25	2.00	12	18	..	12	16
5/8	....	1.25	2.00	11	18	..	11	14
11/16	....	....	2.00	..	..	11, 16	11	14
3/4	....	....	2.00	10	16	..	10	12
7/8	....	....	2.00	9	14	..	9	11

Adjustable Round Split Dies

Fractional Sizes

Carbon Steel

List No. 805

Outside Diameter 2½ Inch, Thickness ¾ Inch

Outside Diameter 3 Inch, Thickness 1 Inch

These dies are furnished with American National or Whitworth form of thread at regular prices.

Sizes and dimensions not listed are special.

Left hand dies are special.

For standard chamfer see Table 360.

Sizes and Prices

Cutting Size Inches	Outside Diameter Price Each		Threads per Inch				
	2½ Inch	3 Inch	N. C.	N. F.	N. S.	Whitworth Standard	British Standard Fine
½	$3.00	....	13	20	..	12	16
9/16	3.00	....	12	18	..	12	16
5/8	3.00	....	11	18	..	11	14
11/16	3.00	....	..	..	11, 16	11	14
¾	3.00	....	10	16	..	10	12
7/8	3.00	....	9	14	..	9	11
1	3.00	$5.00	8	14	..	8	10
1 1/8	....	5.00	7	12	..	7	9
1 ¼	....	5.00	7	12	..	7	9
1 3/8	....	5.00	6	12	..	6	8
1 ½	....	5.00	6	12	..	6	8

Adjustable Round Split Dies

Pipe Sizes

Carbon Steel

List No. 805

Outside Diameter 1 Inch, Thickness ⅜ Inch
Outside Diameter 1½ Inch, Thickness ½ Inch
Outside Diameter 2 Inch, Thickness ⅝ Inch

These dies are furnished with American Standard Pipe form of thread.

The diameter of the thread at the small end is such that the American Standard pipe plug gauge will screw flush with the face of the die.

Sizes marked with a star (*) are thick enough to cut a true American Standard Pipe form of thread with approximately three imperfect threads.

Pipe dies with American Standard straight Pipe thread are special.

Sizes and dimensions not listed are special.

Left hand dies are special.

For standard chamfer see Table 360.

Sizes and Prices

Cutting Size Pipe Inches	Threads per Inch	Outside Diameter — Price Each		
		1 Inch	1½ Inch	2 Inch
⅛	27	*$0.75	*$1.25	.....
¼	18	.....	1.25	*$2.00
⅜	18	.....	1.50	* 2.00
½	14	.....	.....	2.00

Adjustable Round Split Dies

British Association Standard

Carbon Steel

List No. 805

Outside Diameter 13/16 Inch, Thickness 1/4 Inch

These dies are furnished with the British Association form of thread.

Sizes and dimensions not listed are special.

Left hand dies are special.

For standard chamfer see Table 360.

Sizes and Prices

Number	Diameter m/m	Pitch m/m	Outside Diameter 13/16 Inch Price Each
0	6.0	1.00	$0.60
1	5.3	.90	.60
2	4.7	.81	.60
3	4.1	.73	.60
4	3.6	.66	.60
5	3.2	.59	.60
6	2.8	.53	.60
7	2.5	.48	.60
8	2.2	.43	.60
9	1.9	.39	.60
10	1.7	.35	.60
11	1.5	.31	.80
12	1.3	.28	.80
14	1.0	.23	1.10

Adjustable Round Split Dies

Metric Sizes
Carbon Steel
List No. 805
Outside Diameter 13/16 Inch, Thickness 1/4 Inch
Outside Diameter 1 Inch, Thickness 3/8 Inch

These dies are furnished with the French or International form of thread.

French Standard pitches, in sizes 2 m/m to 5.5 m/m, inclusive, are those adopted by the French Navy, Department of War, Railway Companies, etc., and approved by the Society for the Advancement of National Industries.

International Standard pitches under 6 m/m diameter are the German extension of the Standard International System (S. I.) by the Deutsche Industry-Normen.

The International Standard (S. I.) is the same as D. I. N. Standard in sizes 6 m/m and larger.

Sizes and dimensions not listed are special.

Left hand dies are special.

For standard chamfer see Table 360.

Sizes and Prices

Cutting Size m/m	Outside Diameter Price Each		Pitch m/m		
	13/16 Inch	1 Inch	French Standard	International Standard (D. I. N.)	Also Furnished
1.5	$0.90	....	.35	....	....
2	.80	....	.45	.40	.50
2.3	.70	....	....	.40	....
2.5	.70	....	.45	....	....
2.6	.70	....	....	.45	....
3	.60	....	.60	.50	.75
3.5	.60	$0.75	.60	.60	....
4	.60	.75	.75	.70	....
4.5	.60	.75	.75	.75	....
5	.60	.75	.90	.80	.75, 1.00
5.5	.60	.75	.90	.90	.75
6	.60	.75	1.00	1.00	1.25
7	.60	.75	1.00	1.00	1.25
8	.60	.75	1.00	1.25	....
9	....	.75	1.00	1.25	....
10	....	.75	1.50	1.50	1.25
11	....	.75	....	1.50	....
12	....	.75	1.50	1.75	1.25

Adjustable Round Split Dies

Metric Sizes
Carbon Steel
List No. 805

Outside Diameter 1 5/16 Inches, Thickness 7/16 Inch.
Outside Diameter 1 1/2 Inches, Thickness 1/2 Inch.
Outside Diameter 2 Inches, Thickness 5/8 Inch.

These dies are furnished with the French or International form of thread.

International Standard pitches under 6 m/m diameter are the German extension of the Standard International System (S. I.) by the Deutsche Industry-Normen.

The International Standard (S. I.) is the same as D. I. N. Standard on sizes 6 m/m and larger.

Sizes and dimensions not listed are special.

Left hand dies are special.

For standard chamfer see Table 360.

Sizes and Prices

Cutting Size m/m	Outside Diameter Price Each			Pitch m/m		
	1 5/16 Inch	1 1/2 Inch	2 Inch	French Std.	International Std. (D. I. N.)	Also Furnished
6	$1.25	$1.25	....	1.00	1.00	1.25
7	1.25	1.25	....	1.00	1.00	1.25
8	1.25	1.25	....	1.00	1.25	....
9	1.25	1.25	....	1.00	1.25	....
10	1.25	1.25	....	1.50	1.50	1.25
11	1.25	1.25	....	....	1.50	....
12	1.25	1.25	$2.00	1.50	1.75	1.25
13	....	1.25	2.00	....	....	1.50, 1.75, 2.00
14	....	1.25	2.00	2.00	2.00	1.25, 1.75
15	....	1.25	2.00	....	....	1.75, 2.00
16	....	1.25	2.00	2.00	2.00	....
17	....	....	2.00	....	....	2.00
18	....	....	2.00	2.50	2.50	1.50, 2.00
19	....	....	2.00	....	....	2.50
20	....	....	2.00	2.50	2.50	2.00
22	....	....	2.00	2.50	2.50	....
24	....	....	2.00	3.00	3.00	....

Adjustable Round Split Dies

Metric Sizes

Carbon Steel

List No. 805

Outside Diameter 2½ Inches, Thickness ¾ Inch.
Outside Diameter 3 Inches, Thickness 1 Inch.

These dies are furnished with the French or International form of thread.

International Standard pitches under 6 m/m diameter are the German extension of the Standard International System (S. I.) by the Deutsche Industry-Normen.

The International Standard (S. I.) is the same as D. I. N. standard on sizes 6 m/m and larger.

Sizes and dimensions not listed are special.

Left hand dies are special.

For standard chamfer see Table 360.

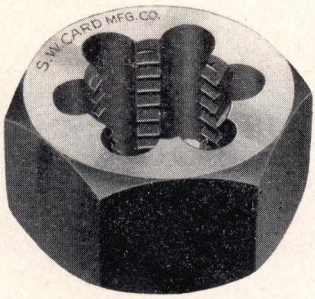
Sizes and Prices

Cutting Size m/m	Outside Diameter Price Each		Pitch m/m		
	2½ Inch	3 Inch	French Std.	International Std. (D. I. N.)	Also Furnished
12	$3.00	....	1.50	1.75	1.25
13	3.00	....	....	....	1.50, 1.75, 2.00
14	3.00	....	2.00	2.00	1.25, 1.75
15	3.00	....	....	....	1.75, 2.00
16	3.00	....	2.00	2.00	....
17	3.00	....	....	....	2.00
18	3.00	....	2.50	2.50	1.50, 2.00
19	3.00	....	....	....	2.50
20	3.00	....	2.50	2.50	2.00
22	3.00	$5.00	2.50	2.50	....
24	3.00	5.00	3.00	3.00	....
26	3.00	5.00	3.00	....	....
27	....	5.00	....	3.00	....
28	....	5.00	3.00	....	....
30	....	5.00	3.50	3.50	....
32	....	5.00	3.50	....	....
33	....	5.00	....	3.50	....
34	....	5.00	3.50	....	....
36	....	5.00	4.00	4.00	....
38	....	5.00	4.00	....	....

Hexagon Rethreading Dies

Carbon Steel

List No. 875



These dies are used only for repair work, for dressing over bruised or rusty threads.

Hexagon rethreading dies are furnished with American National or Whitworth form of thread at regular prices.

Sizes and dimensions not listed are special.

Left hand dies are special.

For standard chamfer see Table 360.

Sizes and Prices

Cutting Size Inches	Price Each	Threads per Inch				Dimensions Inches	
		N.C.	N.F.	N.S.	Whitworth Std.	Across Flats	Thickness
1/4	$0.70	20	28	..	20	19/32	1/4
5/16	.80	18	24	..	18	11/16	5/16
3/8	.90	16	24	..	16	25/32	3/8
7/16	1.00	14	20	..	14	7/8	7/16
1/2	1.10	13	20	..	12	1 1/16	1/2
9/16	1.20	12	18	..	12	1 1/16	1/2
5/8	1.40	11	18	..	11	1 1/4	5/8
11/16	1.60	..	..	11, 16	11	1 7/16	3/4
3/4	1.80	10	16	..	10	1 7/16	3/4
7/8	2.10	9	14	..	9	1 5/8	7/8
1	2.40	8	14	..	8	1 13/16	1
1 1/8	2.80	7	12	..	7	2	1
1 1/4	3.20	7	12	..	7	2 3/16	1
1 3/8	3.60	6	12	..	6	2 3/8	1
1 1/2	4.00	6	12	..	6	2 9/16	1

Hexagon Rethreading Dies

In Sets

Carbon Steel

List No. 875

These dies can be used in socket, ratchet or monkey wrenches, for dressing over bruised and rusty threads. Each assortment conveniently packed in oil and varnish finished hinged cover case at no extra charge.

Sets Nos. 820-821-822 will be regularly furnished with American National form of thread.

N.F. or Whitworth Standard will be substituted at same prices if so specified.

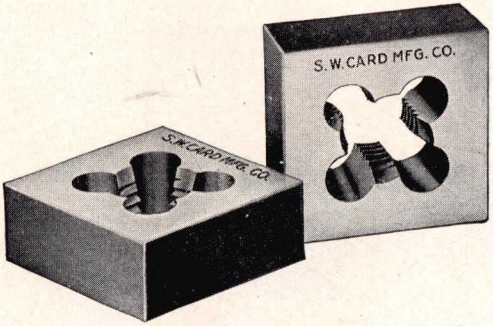
Sizes and Prices

Number	820	821	822	824		825	
	N.C.	N.C.	N.C.	N.C.	N.F.	N.C.	N.F.
Cutting Size	1/4 5/16 3/8 7/16 1/2	1/4 5/16 3/8 7/16 1/2 9/16 5/8 3/4	1/4 5/16 3/8 7/16 1/2 9/16 5/8 3/4 7/8 1	1/4 5/16 3/8 7/16 1/2	1/4 5/16 3/8 7/16 1/2	1/4 5/16 3/8 7/16 1/2 9/16 5/8 3/4	1/4 5/16 3/8 7/16 1/2 9/16 5/8 3/4
Net Weight, Lbs.	1/2	1 1/2	2 1/2	1		2 1/2	
Price, Dollars	4.50	8.90	13.40	9.00		17.80	

Solid Square Pipe Dies

Carbon Steel

List No. 900



These dies are furnished with American Standard Pipe form of thread.

The diameter of the thread at the small end is such that the American Standard Pipe plug gauge will screw approximately flush with the face of the die.

Sizes marked with a star (*) are thick enough to cut a true American Standard Pipe form of thread with approximately three imperfect threads.

Sizes and dimensions not listed are special.

Straight pipe dies are special.

Left hand dies are special.

For standard chamfer see Table 360.

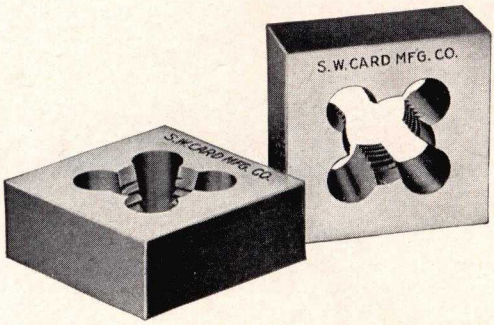
Sizes and Prices

Cutting Size Pipe Inches	Fitting Stocks (Nominal Size)—Price Each				
	2″ Square x ½″ Deep	2½″ Square x ¾″ Deep	3″ Square x ¾″ Deep	4″ Square x 1″ Deep	5″ Square x 1¼″ Deep
⅛	*$1.80	*$1.80	....	....	....
¼	1.90	* 1.90	....	....	....
⅜	2.10	* 2.10	....	....	....
½	2.40	* 2.40	*$3.10	....	....
¾	....	* 3.00	* 3.45	....	....
1	....	3.60	3.75	*$5.00	....
1¼	....	....	5.40	* 6.50	....
1½	....	....	....	* 7.50	....
2	....	....	....	8.50	....
2½	....	....	....	....	$12.50
3	....	....	....	....	15.00

Solid Square Bolt Dies

Carbon Steel

List No. 901



These dies are furnished with American National form of thread.
Sizes and dimensions not listed are special.
Left hand dies are special.
For standard chamfer see Table 360.

Sizes and Prices

Cutting Size Inches	Price Each	Threads per Inch		Dimensions—Inches	
		N. C.	N. S.	Size of Square	Thickness
1/4	$1.80	20	....	2 1/2	1/2
5/16	1.80	18	....	2 1/2	1/2
3/8	1.80	16	....	2 1/2	1/2
7/16	1.80	14	....	2 1/2	1/2
1/2	1.80	13	....	2 1/2	3/4
9/16	1.90	12	....	2 1/2	3/4
5/8	2.00	11	....	2 1/2	3/4
3/4	2.20	10	....	2 1/2	3/4
7/8	2.40	9	....	2 1/2	3/4
1	2.70	8	....	2 1/2	1
1 1/8	3.00	7	....	2 1/2	1
1 1/4	3.30	7	....	2 1/2	1
1 3/8	3.60	6	....	2 1/2	1
1 1/2	3.90	6	....	3	1
1 5/8	4.20	..	5 1/2	3	1
1 3/4	5.40	5	....	3	1 1/4
1 7/8	6.50	..	5	3 1/2	1 1/2
2	7.50	4 1/2	....	3 3/4	2

Diamond Die Stocks

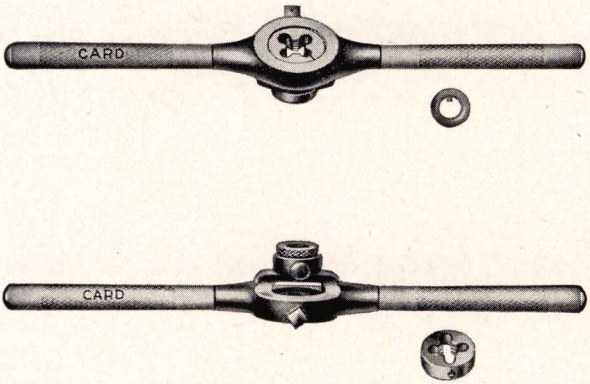
List No. 301

These die stocks are designed to accommodate the round screw adjustable dies listed on pages 53 to 62 inclusive.

Number of Stock	Length Inches	Outside Diameter of Die, Inches	Price Each
1	3¼	7/16	$0.50
2	5	5/8	.75
3	7	13/16	1.00
4	9	1	1.25
5	14	1 5/16	1.75
6	18	1 ½	2.00
9	26	2	2.50
11	30	2 ½	3.50
12	37	3	6.00

Improved Die Stocks

List No. 303



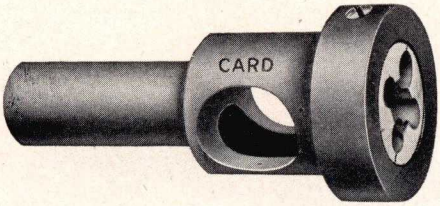
Die Stocks showing die and guide in position—a guide for each cutting size.

Improved Die Stocks				Guides	
Number	Length Inches	Outside Diameter of Die, Inches	Price Each	Fitting Stock Number	Price Each
50	7	13/16	$1.50	50	$0.15
70	14	1 5/16	3.00	70	.30
85	26	2	3.50	85	.40

Lathe Die Holders

List No. 801

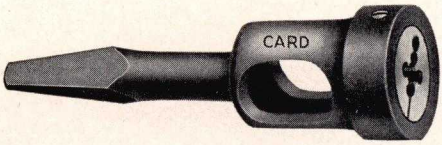
For Use in Lathe or Turret of Screw Machine



No. of Holder	Takes Dies of Outside Diameter	Diameter of Shank Inches	Price Each Holder Only
1	5/8	1/2	$0.75
1 1/2	13/16	1/2	1.00
2	1	5/8	1.50
3	1 5/16	3/4	2.00
3 1/2	1 1/2	3/4	2.50

Bit Brace Die Holders

List No. 802



No. of Holder	Takes Dies of Outside Diameter	Price Each Holder Only
1	5/8	$0.75
2	13/16	1.00
3	1	1.50

Hand Chasers

Carbon Steel

List No. 904 Inside

List No. 904-A Outside

Hand chasers are regularly furnished with American National form of thread unless otherwise specified.

V form furnished at regular prices as listed.

Right and left hand threads may be cut with the same chaser.

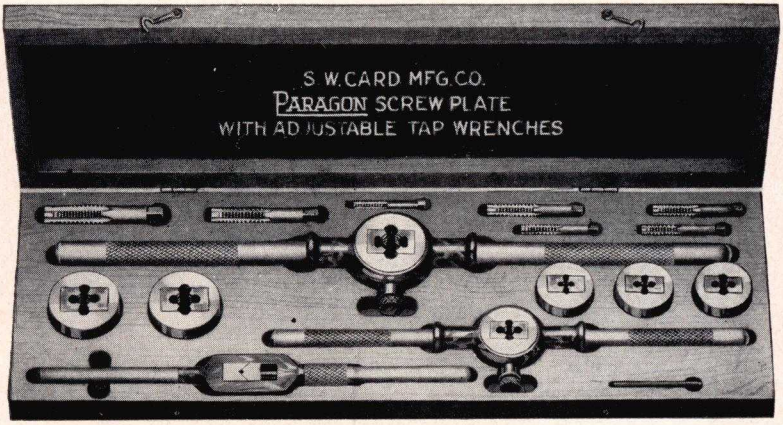
Chasers having pitches other than listed will be priced as special.

Specify inside or outside and form of thread required.

Sizes and Prices

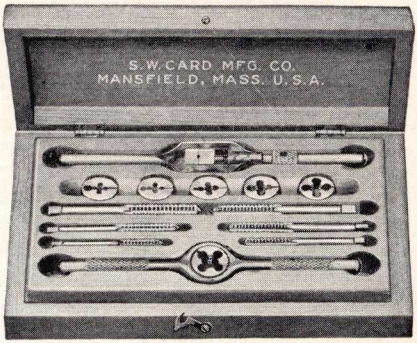
Number of Threads to the Inch	Price Each		Number of Threads to the Inch	Price Each	
	National Form	V Form		National Form	V Form
5	$1.00	.....	14	$0.90	$0.90
5½	1.00	.....	16	.80	.....
6	1.00	.....	18	.80	.80
7	1.00	.....	20	.80	.....
8	1.00	$1.00	24	.70	.....
9	.90	.....	27	.....	.70
10	.90	.....	28	.70	.....
11	.90	.....	32	.70	.....
11½	.....	.90	36	.70	.....
12	.90	.....	40	.70	.....
13	.90	.....	..	.....	.....

Screw Plate Section



Diamond Screw Plates

List No. 301



These Diamond assortments are popular for small work of all kinds. They are assembled with tools of high quality and give good satisfaction in service.

American National form of thread furnished unless otherwise ordered. Whitworth Standard threads furnished in the fractional sizes at same prices when so specified.

Sizes and Prices

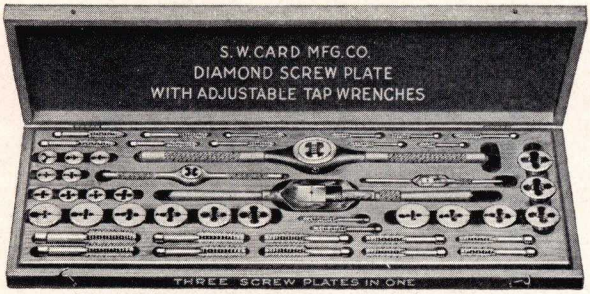
Set No.	N	NN	O	PC	P-1	P-3	Q	T-1
One plug tap and one round adjustable die for each size.	4–36 6–32 8–32 10–24 10–24	4–36 6–32 8–32 10–24 12–24 ¼–20	4–36 6–32 8–32 10–24 10–32 12–24 ¼–20	4–36 6–32 8–32 10–24 10–32 12–24 ¼–20 5/16–18	2–56 3–48 4–36 6–32 8–32 10–24 12–24 ¼–20	2–56 3–48 4–36 6–32 8–32 10–24 10–32 12–24 ¼–20 5/16–18	1/8–40 5/32–32 3/16–24 7/32–24 ¼–20	1/16–64 3/32–48 1/8–40 5/32–32 3/16–24 3/16–32 7/32–24 ¼–20 5/16–18
Dies Diam., Inches	13/16	13/16	13/16	13/16	13/16	13/16	13/16	13/16
Stock No. Length, Inches	3 7	3 7	3 7	3 7	3 7	3 7	3 7	3 7
Tap Wrench No.	8	8	8	8	8	8	8	8
Price, Dollars	8.00	9.00	10.00	11.00	11.00	13.00	8.00	12.75

Diamond Screw Plates

List No. 301

For Garage and General Repair Work

Three Screw Plates in One



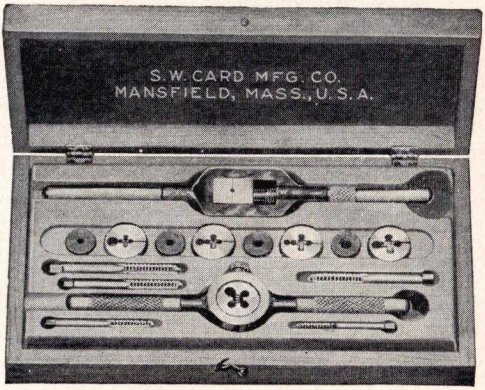
The No. 6 Diamond screw plate is the most complete repair screw plate we catalog. It is three screw plates in one containing a good assortment of machine screw, N. C. and N. F. sizes in both taps and dies. Complete in one case at a low list price. There is not a size in the assortment that you may not be called upon to use every day.

Sizes and Prices

Set No.	6 Diamond		
Thread Standard	Machine Screw	N. C.	N. F.
One plug tap and one round adjustable die for each cutting size. Also One American National Pipe tap with die to match size 1/8.	2–56 3–48 4–36 6–32 8–32 10–24 12–24	1/4–20 5/16–18 3/8–16 7/16–14 1/2–13 9/16–12 5/8–11	1/4–28 5/16–24 3/8–24 7/16–20 1/2–20 9/16–18 5/8–18
Dies, Diam., Inches	13/16	1 1/2	1 1/2
Stock No.	3	6	
Length, Inches	7	18	
Tap Wrenches Nos.	8	10	
Price, Dollars	40.00		

Improved Screw Plates

List No. 303



A Round Die Screw Plate—Guide for Each Cutting Size

Improved screw plates are furnished with adjustable round split dies and steel guides. These dies are adjusted by means of a tapering screw and will allow of sufficient adjustment to obtain either a tight or a loose fit. They are so constructed that they will always grip the screw whether it is moved in or out, thereby keeping the cutting teeth of the dies in perfect alignment.

Improved die stocks and guides are shown on page 68.

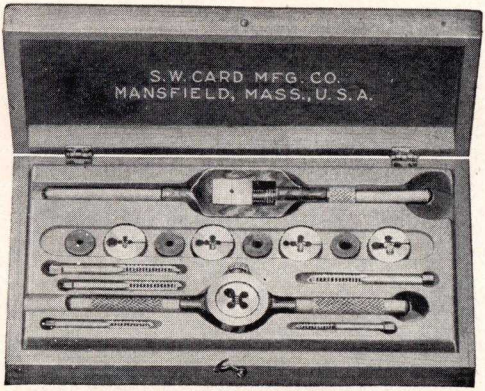
The stock to be threaded enters the guide side. When threading close to a shoulder, use face side of die.

Increased sales make it possible to list these desirable tools at attractive prices.

Each assortment is put up in a neat hard wood, oiled and varnished case.

Improved Screw Plates

List No. 303



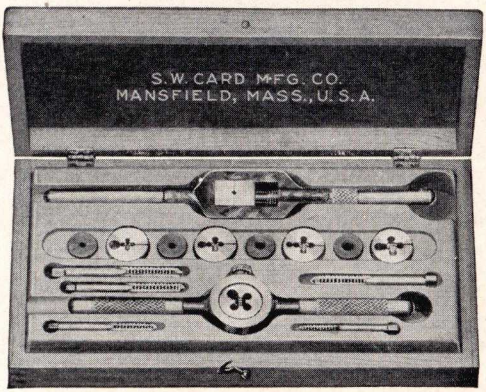
Improved screw plates are furnished with round adjustable dies and a guide for each cutting size. The guide is desirable to insure cutting the thread straight. American National form of thread sent unless otherwise ordered. Whitworth Standard threads furnished in fractional sizes when so specified.

Sizes and Prices

Set No.	50	51	52BC	53
One plug tap and one round adjustable die and guide for each cutting size.	4–36 6–32 8–32 10–24 12–24	4–36 6–32 8–32 10–24 10–32 12–24 1/4–20	2–56 3–48 4–36 6–32 8–32 10–24 10–32 12–24 1/4–20 5/16–18	1/8–40 5/32–32 3/16–24 7/32–24 1/4–20
Dies Diam., Inches	13/16	13/16	13/16	13/16
Guide No.	50	50	50	50
Stock No.	50	50	50	50
Length, Inches	7	7	7	7
Tap Wrench No.	8	8	8	8
Price, Dollars	9.50	11.75	15.50	9.50

Improved Screw Plates

List No. 303



Improved screw plates are furnished with round adjustable dies and guides for each cutting size. The guides are desirable to insure cutting the thread straight. American National form of thread sent unless otherwise ordered. Whitworth Standard threads furnished if so specified.

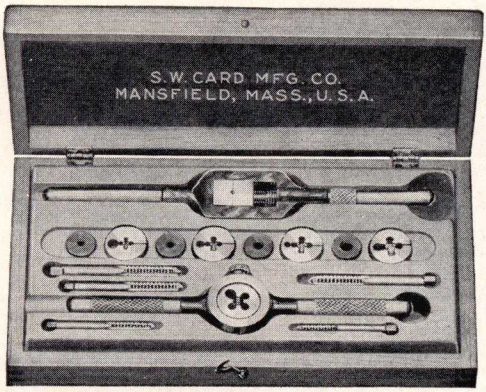
Sizes and Prices

Set No.	70	85	105
Thread Standard	N.C.	N.C.	N.C.
One taper tap and one round adjustable die and guide for each size.	1/4–20 5/16–18 3/8–16 7/16–14 1/2–13	1/4–20 5/16–18 3/8–16 7/16–14 1/2–13 5/8–11 3/4–10	1/4–20 5/16–18 3/8–16 7/16–14 1/2–13 5/8–11 3/4–10 7/8–9 1–8
Dies, Diam., Inches	1 5/16	2	1 5/16–2
Guide No.	70	85	70–85
Stock No.	70	85	70–85
Length, Inches	14	26	14–26
Tap Wrench No.	9	10	9–11
Price, Dollars	17.00	25.50	39.00

Improved Screw Plates

List No. 303

For Garage and General Repair Work



Improved screw plates are furnished with round adjustable dies and guides for each cutting size. The guides are desirable to insure cutting the thread straight. The form of thread for all sizes is American National Fine (N.F.)

Sizes and Prices

Set No.	71	86	106
Thread Standard	N.F.	N.F.	N.F.
One plug tap and one round adjustable die and guide for each size.	1/4–28 5/16–24 3/8–24 7/16–20 1/2–20	1/4–28 5/16–24 3/8–24 7/16–20 1/2–20 5/8–18 3/4–16	1/4–28 5/16–24 3/8–24 7/16–20 1/2–20 5/8–18 3/4–16 7/8–14 1–14
Dies, Diam., Inches	1 5/16	2	1 5/16–2
Guide No.	70	80	70–85
Stock No.	70	85	70–85
Length, Inches	14	26	14–26
Tap Wrench No.	9	10	9–11
Price, Dollars	17.00	25.50	39.00

Watchmakers' Screw Plate

List No. 401

Set No. 1. Stock, 3¼ inches long; Dies, 7/16 inch diameter; 4 Taps and 5 Dies, including Tap Wrench Die, cutting .067–80, .055–100, .0465–120, .038–140 threads.

Price each	$7.50
Extra Dies, price each .	.60
Extra Taps, price each .	.70

The sizes and threads in this plate correspond to the sizes of watch screws.

The dies in this plate are adjustable for making tight or loose fits.

Jewelers' Screw Plate

List No. 402

Set No. 1. Stock, 3¼ inches long; Dies, 7/16 inch diameter 4 Taps and 5 Dies, including Tap Wrench Die, cutting 1/16–72, 3/32–60, 1/8–50, 9/64–40.

Price each	$6.00
Extra Dies, price each .	.60
Extra Taps, price each .	.70

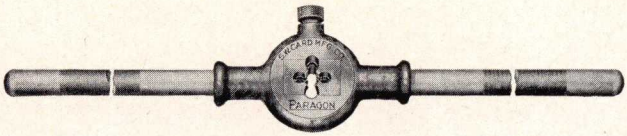
We have selected these sizes and threads as those best suited for the use of jewelers.

The dies in this plate are adjustable for making tight or loose fits.

Both of the above plates are put up in hard wood cases.

Paragon Screw Plates

List No. 500



In the manufacture of Paragon Screw Plates, we have exercised our usual care in turning out a **finished product,** and we solicit the patronage of anyone wanting a screw plate **way beyond the ordinary** from every standpoint.

By referring to cuts on the next page, the construction of the Paragon Die and Guide is easily apparent.

Our method of a **square lock** in fitting the die into the cap gives an exceptionally good bearing surface to the die, and insures perfect alignment when the guide is screwed into place. There is no chance for wear and displacement of die in this style of fit, thus the alignment is sure to be maintained during the whole life of the die.

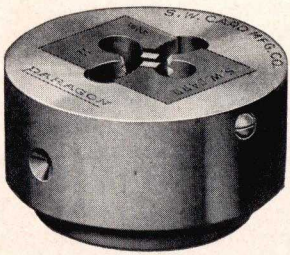
The parallel adjustment feature of this die is an improvement over the ordinary round die, and a strong point in its favor.

When, from continued use, new dies are necessary, they can be purchased at slight cost.

To cut close to a shoulder, start the thread with the guide side of the die and finish with the face side.

We strongly recommend the Paragon Die in all screw plate assortments from ¼ inch to 1 inch.

The Stocks are very light, and they are also strong and serviceable.



Each screw plate assortment is supplied with one or more Tap Wrenches necessary to cover the range of sizes in the assortment.

When ordering repairs give Set Number and Collet Number.

Duplicate parts can be furnished for these plates without returning them to the factory, as they are all made interchangeable.

Paragon Screw Plates

List No. 500

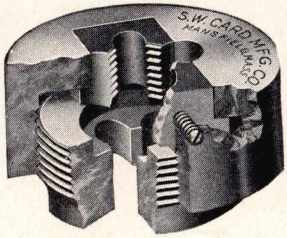


Fig. 1.
SECTIONAL VIEW
OF
COLLET, DIE AND
GUIDE

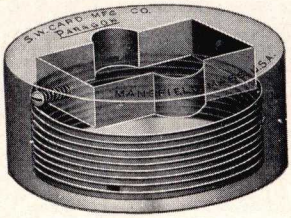


Fig. 2.
COLLET

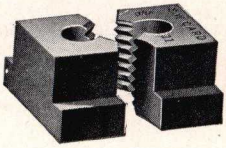


Fig. 3.
PARAGON
ADJUSTABLE DIE

Fig. 4.
GUIDE

For list prices of parts of Paragon Screw Plates, see pages 85 and 86.

Paragon Screw Plates

List No. 500

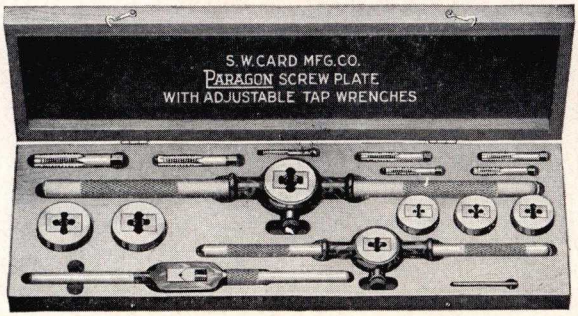
American National Coarse (N.C.) threads furnished unless otherwise ordered. Whitworth Standard threads furnished at regular prices when specified.

Sizes and Prices

Set No.	502	504	504½	505
One taper tap and one die, collet and guide for each cutting size.	¼–20 5/16–18 ⅜–16 7/16–14 ½–13	¼–20 5/16–18 ⅜–16 7/16–14 ½–13 ⅝–11 ¾–10	¼–20 5/16–18 ⅜–16 7/16–14 ½–13 9/16–12 ⅝–11 ¾–10	¼–20 5/16–18 ⅜–16 7/16–14 ½–13 ⅝–11 ¾–10 ⅞–9 1–8
Collet No. Diam., Inches	13 2	14 2½	14 2½	15 3
Stocks No. Length, Inches	13 16	14 24	14 24	15 31
Tap Wrench No.	9	10	10	9–11
Price, Dollars	18.50	27.50	30.75	42.00

Paragon Screw Plates

List No. 500



American National Coarse (N.C.) threads furnished unless otherwise ordered. Whitworth Standard threads furnished at regular prices when specified.

Sizes and Prices

Set No.	510	511
One taper tap and one die, collet and guide for each cutting size.	1/4–20 5/16–18 3/8–16 7/16–14 1/2–13 5/8–11 3/4–10	1/4–20 5/16–18 3/8–16 7/16–14 1/2–13 5/8–11 3/4–10 7/8– 9 1– 8
Collet No. Diam., Inches	13–14 2–2 1/2	13–15 2–3
Stocks No. Length, Inches	13–14 16–24	13–15 16–31
Tap Wrench No.	10	9–11
Price, Dollars	30.00	43.50

Paragon Screw Plates

List No. 500

For Garage and General Repair Work

Furnished with American National Fine (N.F.) threads only.

These assortments are recommended for automobile repair work when most of the threads are American National Fine.

Sizes and Prices

Set No.	518	518½	519A
One plug tap and one die, collet and guide for each cutting size.	¼–28 5/16–24 ⅜–24 7/16–20 ½–20	¼–28 5/16–24 ⅜–24 7/16–20 ½–20 ⅝–18 ¾–16	¼–28 5/16–24 ⅜–24 7/16–20 ½–20 ⅝–18 ¾–16 ⅞–14 1–14
Collet No. Diam., Inches	13 2	14 2½	13–15 2–3
Stock No. Length, Inches	13 16	14 24	13–15 16–31
Tap Wrench No.	9	10	9–11
Price, Dollars	18.50	27.50	43.50

Paragon Screw Plates

List No. 500

For Garage and General Repair Work

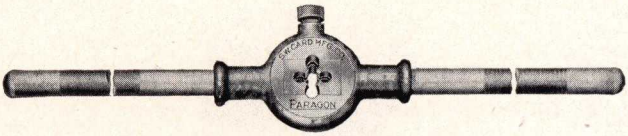
Furnished with Combination N.C. and N.F. Threads. These assortments cover American National Coarse and American National Fine threads in one complete assortment.

Sizes and Prices

Set No.	520		521		522		523	
Thread Standard	N.C.	N.F.	N.C.	N.F.	N.C.	N.F.	N.C.	N.F.
One of each cutting size N.C. taper tap and die, collet and guide: one N.F. plug tap and die, collet and guide.	1/4–20 5/16–18 3/8–16 7/16–14 1/2–13	1/4–28 5/16–24 3/8–24 7/16–20 1/2–20	1/4–20 5/16–18 3/8–16 7/16–14 1/2–13 5/8–11 3/4–10	1/4–28 5/16–24 3/8–24 7/16–20 1/2–20 5/8–18 3/4–16	1/4–20 5/16–18 3/8–16 7/16–14 1/2–13 9/16–12 5/8–11 3/4–10	1/4–28 5/16–24 3/8–24 7/16–20 1/2–20 9/16–18 5/8–18 3/4–16	1/4–20 5/16–18 3/8–16 7/16–14 1/2–13 9/16–12 5/8–11 3/4–10 7/8– 9 1–8	1/4–28 5/16–24 3/8–24 7/16–20 1/2–20 9/16–18 5/8–18 3/4–16 7/8–14 1–14
Collet No. Diam., Inches	13 2		14 2 1/2		14 2 1/2		13–15 2–3	
Stock No. Length, Inches	13 16		14 24		14 24		13–15 16–31	
Tap Wrench No.	9		10		10		9–11	
Price, Dollars	29.25		50.00		56.00		79.00	

Paragon Die Stocks

List No. 500



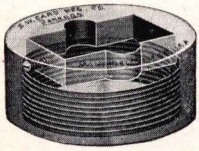
Sizes and Prices

No. of Stock	Length of Stock Inches	Fitting Collet No. 3	Diameter of Collet Inches	Price Each
13	16	13	2	$2.50
14	24	14	2½	3.00
15	31	15	3	3.50

For prices on tap wrenches, see page 51.

Paragon Collets and Guides

List No. 500



Sizes and Prices

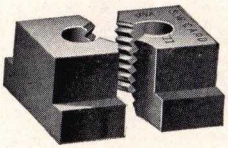
When ordering, give number of collet wanted, also cutting size of die with which collet is to be used.

For price list of taps and dies, see pages 13 and 86.

Size of Die Inches	No. of Collet	Diameter of Collet Inches	Guide	Collet	Collet and Guide
¼ to ½	13	2	$0.30	$0.50	$0.80
¼ to ¾	14	2½	.50	.80	1.30
¼ to 1	15	3	.65	1.00	1.65

Paragon Dies

List No. 500



American National form of thread furnished unless otherwise specified. Whitworth Standard supplied at regular prices.

When ordering, give number of collet wanted, also cutting size of die.

No. 13 collet holds ¼ to ½″ sizes.

No. 14 collet holds ¼ to ¾″ sizes.

No. 15 collet holds ¼ to 1″ sizes.

Specify form of thread required.

Paragon Dies are supplied only in sizes and pitches as listed below.

Paragon Dies, N.F. pitches, ¼ to ½″ inclusive to fit No. 15 collet are special.

Left hand dies are special.

Extra stocks, guides and collets are listed on page 85.

Extra taps — see page 13.

Sizes and Prices

Cutting Size Inches	Price Each	Threads per Inch		
	Dies	N.C.	Whitworth	N.F.
¼	$1.00	20	20	28
5/16	1.00	18	18	24
⅜	1.25	16	16	24
7/16	1.25	14	14	20
½	1.50	13	12	20
9/16	1.50	12	12	18
⅝	1.75	11	11	18
¾	2.00	10	10	16
⅞	2.75	9	9	14
1	2.75	8	8	14

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CUT AND GROUND THREAD, AM. STD. TAPER PIPE TAPS 338
CUT AND GROUND THREAD, BRITISH STD. TAPER PIPE TAPS 340
GROUND THREAD, COMMERCIAL FRACTIONAL TAPS 326
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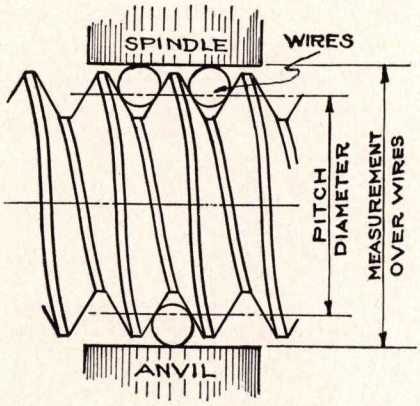
TABLE 300

Three Wire System of Measurement



The demand for closer accuracy in tapped holes than has been required in the past has led to great refinements in the manufacturing of taps, which necessitates more accurate methods and instruments for measuring.

The so-called "Three Wire System" has become universally recognized and adopted as the most accurate and satisfactory commercial method devised for measuring Pitch Diameters of Taps.

It is essential in using this method that the micrometers used be accurate and the measuring faces flat and parallel; that the wires used be hardened. The surfaces must be properly finished and the set of wires the same diameter within .00003 inch if measurement within .0001 inch is desired.

The "best" size wire to use is one whose diameter is such that the point of contact with the sides of the thread will come at the mid slope as at this point the least error will be introduced due to any error in the angle of thread.

Above will be found a diagram showing the method of applying the wires for the measurement of a thread.

On page 90 will be found the best size wires to use for the various pitches and the constant to subtract from the micrometer reading to obtain the pitch diameter.

The wire sizes and constants given are for use with a thread which has an included angle of 60°.

TABLE 300

Three Wire System of Measurement

Table of Wire Sizes and Constants for Obtaining Pitch Diameters

Threads per Inch	Pitch	Correct Size Wire	Constant for Correct Wire	Single Depth Nat. Form Thread	Single Depth V Form
4	.250000	.1443387	.216509	.162379	.216506
4½	.222222	.1282998	.192449	.144337	.192450
5	.200000	.1154700	.173205	.129903	.173205
5½	.181818	.1049727	.157459	.118093	.157459
6	.166666	.0962250	.144338	.108253	.144337
7	.142857	.0824786	.123718	.092788	.123717
8	.125000	.0721687	.108253	.081189	.108253
9	.111111	.0641500	.096225	.072168	.096225
10	.100000	.0577350	.086602	.064952	.086602
11	.090909	.0524863	.078729	.059046	.078729
12	.083333	.0481125	.072169	.054127	.072168
13	.076923	.0444115	.066617	.049963	.066617
14	.071428	.0412393	.061859	.046394	.061858
16	.062500	.0360841	.054125	.040595	.054126
18	.055555	.0320746	.048110	.036086	.048112
19	.052631	.0303865	.045579	.034185	.045580
20	.050000	.0288675	.043301	.032475	.043301
22	.045454	.0262431	.039365	.029523	.039364
24	.041666	.0240553	.036082	.027063	.036084
27	.037037	.0213833	.032075	.024056	.032075
28	.035714	.0206194	.030929	.023197	.030929
30	.033333	.0192448	.028867	.021651	.028867
32	.031250	.0180421	.027063	.020297	.027063
34	.029411	.0169804	.025470	.019103	.025471
36	.027777	.0160370	.024055	.018042	.024057
40	.025000	.0144337	.021650	.016237	.021650
44	.022727	.0131214	.019682	.014761	.019682
48	.020833	.0120279	.018041	.013531	.018042
50	.020000	.0115470	.017320	.012990	.017320
56	.017857	.0103097	.015464	.011598	.015465
64	.015625	.0090210	.013531	.010148	.013531

TABLE 301

Standard System of Marking

1. General.

Manufacturers of small tools recognizing the necessity of a standard system of marking taps, dies and other threading tools will mark their tools with the nominal size, number of threads per inch, and the proper symbol to identify the thread form.

Symbols commonly used in American practice are:

N. C., indicating American National Coarse Thread Series.
N. F., indicating American National Fine Thread Series.
N., indicating American National 8, 12 and 16 pitch Series.
N. S., indicating American National Special Thread Series.
N. P. T., indicating American Standard Taper Pipe Threads.
N. P. S., indicating American Standard Straight Pipe Threads.
GREASE, indicating a standardized undersize straight pipe thread for grease cup fittings.
STEAM, indicating a straight pipe thread used on coupling taps.
CONDUIT, indicating an oversize straight pipe thread used on coupling taps.
V, indicating a 60 degree V thread usually with both the crest and root flatted several thousandths from the theoretical to the user's specifications.
ACME, indicating a standardized 29 degree thread.
S. B., indicating manufacturers stove bolt standard thread.

Such markings as U.S.S., U.S.F., S.A.E., and A.S.M.E. are now obsolete.

2. Bent Shank Tapper Taps.

In addition to the regular marking bent shank tapper taps when made to Table No. 336 are marked "Class 2."

3. Special Taps.

Special taps (except ground thread taps marked with a limit number as specified in section No. 4) varying only slightly from standard dimensions are to be marked with the letter "S" enclosed in a circle Ⓢ.

Taps varying on the pitch diameter up to .015″ over or under basic will be marked with the actual amount the low limit is over or under basic size, in addition to the standard size.

Left hand taps will be marked "Left Hand" or "L. H." in addition to the standard marking.

4. Ground Thread Taps.

All commercial ground thread taps made to the thread limits shown in Tables No. 326 and No. 329, will be marked with one ring on the shank near the thread in addition to the standard marking.

All precision ground thread taps made to the thread limits shown in Table No. 327 will be marked with the limit number. Other precision ground thread taps will be marked with the same limit number, as follows:

Taps having a pitch diameter between basic and minus .0005″.. 01
Taps having a pitch diameter between basic and plus .0005″... 1
Taps having a pitch diameter between .0005″ to .0010″ over basic 2

(Continued on following page)

TABLE 301

Standard System of Marking

(Continued)

Ground thread pipe taps made to Tables No. 335 and No. 338 will be marked "CG."

Other special ground thread taps will be marked "CG" if the pitch diameter grinding tolerance is equal to or greater than shown below, and will be marked "PG" if it is less.

4 to 5½ threads per inch inclusive	.0020″
6 threads per inch	.0018″
7 threads per inch	.0015″
8 threads per inch	.0014″
9 threads per inch	.0012″
10 and 11½ threads per inch	.0011″
12 threads per inch and finer	.0010″

5. Multiple Thread Taps and Dies.

Taps and dies having multiple thread will be marked with diameter, number of threads to the inch, form of thread and lead designated in fractions; also double, triple or quadruple.

For example: A 1″—16 double thread special tap with National form of thread will be marked as follows:

1″—16 N. S.
⅛″ Lead Double

The same tap with Acme thread will be marked as follows:

1″—16 Acme
⅛″ Lead Double

6. American National Thread Series.

The sizes and pitches included in the American National Coarse Thread Series are as follows:

No. 1—64	No. 12—24	¾″—10	2″ —4½
No. 2—56	¼″—20	⅞″— 9	2¼″—4½
No. 3—48	5/16″—18	1″ — 8	2½″—4
No. 4—40	⅜″—16	1⅛″— 7	2¾″—4
No. 5—40	7/16″—14	1¼″— 7	3″ —4
No. 6—32	½″—13	1⅜″— 6	3¼″—4
No. 8—32	9/16″—12	1½″— 6	3½″—4
No. 10—24	⅝″—11	1¾″— 5	3¾″—4
			4″ —4

The sizes and pitches included in the American National Fine Thread Series are as follows:

No. 0—80	No. 6—40	⅜″—24	⅞″—14
No. 1—72	No. 8—36	7/16″—20	1″ —14
No. 2—64	No. 10—32	½″—20	1⅛″—12
No. 3—56	No. 12—28	9/16″—18	1¼″—12
No. 4—48	¼″—28	⅝″—18	1⅜″—12
No. 5—44	5/16″—24	¾″—16	1½″—12

TABLE 301

Standard System of Marking

(Concluded)

Sizes and pitches not specified above and having the American National Form of thread are classed as the American National Special Thread Series.

British Thread Forms

In order to conform with British practice, the following markings should be used on taps and dies. The authority for this marking will be found in the British Standards Institute Publication No. 84-1940.

BSW., indicating British Standard Whitworth coarse threads.

BSF., indicating British Standard Fine threads.

BSP., Parallel indicating British Standard Straight Pipe threads.

BSP., Taper indicating British Standard Taper Pipe threads.

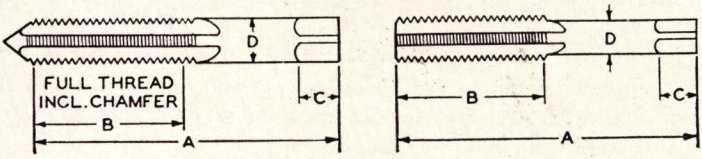
WHIT., indicating Whitworth Standard special threads.

BA., indicating British Association Standard threads.

It is customary for the British to speak of a set of taps as consisting of "taper, second or intermediate and plug," corresponding with the American practice of "taper, plug and bottoming." This difference in meaning should be borne in mind to avoid confusion.

TABLE 302

Hand Taps



General Dimensions

Diameter of Tap Inches	Dimensions—Inches				
	Length Overall A	Length of Full Thread B	Length of Square C	Diameter of Shank D	Size of Square E
1/16	1 5/8	5/16	3/16	.141	.110
3/32	1 3/4	7/16	3/16	.141	.110
1/8	1 15/16	5/8	3/16	.141	.110
5/32	2 1/16	3/4	1/4	.160	.125
3/16	2 3/8	7/8	1/4	.192	.149
7/32	2 3/8	15/16	1/4	.223	.167
1/4	2 1/2	1	9/32	.255	.191
9/32	2 1/2	1	5/16	.286	.214
5/16	2 23/32	1 1/8	5/16	.318	.238
11/32	2 23/32	1 1/8	11/32	.349	.262
3/8	2 15/16	1 1/4	3/8	.381	.286
13/32	3 5/32	1 7/16	13/32	.323	.242
7/16	3 5/32	1 7/16	13/32	.323	.242
15/32	3 5/32	1 7/16	13/32	.354	.265
1/2	3 3/8	1 21/32	7/16	.367	.275
17/32	3 3/8	1 21/32	7/16	.398	.298
9/16	3 19/32	1 21/32	1/2	.429	.322
19/32	3 19/32	1 21/32	1/2	.460	.345
5/8	3 13/16	1 13/16	9/16	.480	.360
21/32	3 13/16	1 13/16	9/16	.511	.383
11/16	4 1/32	1 13/16	5/8	.542	.406
23/32	4 1/32	1 13/16	5/8	.573	.430
3/4	4 1/4	2	11/16	.590	.442
25/32	4 1/4	2	11/16	.621	.466
13/16	4 15/32	2	11/16	.652	.489
27/32	4 15/32	2	11/16	.684	.513
7/8	4 11/16	2 7/32	3/4	.697	.523
15/16	4 29/32	2 7/32	3/4	.760	.570
1	5 1/8	2 1/2	13/16	.800	.600
1 1/16	5 1/8	2 1/2	13/16	.862	.646
1 1/8	5 7/16	2 9/16	7/8	.896	.672
1 3/16	5 7/16	2 9/16	7/8	.959	.719

(Continued on following page)

TABLE 302

Hand Taps

(Continued)

General Dimensions

Diameter of Tap Inches	Dimensions—Inches				
	Length Overall A	Length of Full Thread B	Length of Square C	Diameter of Shank D	Size of Square E
1 1/4	5 3/4	2 9/16	1	1.021	.766
1 5/16	5 3/4	2 9/16	1	1.084	.813
1 3/8	6 1/16	3	1 1/16	1.108	.831
1 7/16	6 1/16	3	1 1/16	1.171	.878
1 1/2	6 3/8	3	1 1/8	1.233	.925
1 5/8	6 11/16	3 3/16	1 1/8	1.305	.979
1 3/4	7	3 3/16	1 1/4	1.430	1.072
1 7/8	7 5/16	3 9/16	1 1/4	1.519	1.139
2	7 5/8	3 9/16	1 3/8	1.644	1.233
2 1/8	8	3 9/16	1 3/8	1.769	1.327
2 1/4	8 1/4	3 9/16	1 7/16	1.894	1.420
2 3/8	8 1/2	4	1 7/16	2.019	1.514
2 1/2	8 3/4	4	1 1/2	2.100	1.575
2 5/8	8 3/4	4	1 1/2	2.225	1.669
2 3/4	9 1/4	4	1 9/16	2.350	1.762
2 7/8	9 1/4	4	1 9/16	2.475	1.856
3	9 3/4	4 9/16	1 5/8	2.543	1.907
3 1/8	9 3/4	4 9/16	1 5/8	2.668	2.001
3 1/4	10	4 9/16	1 3/4	2.793	2.095
3 3/8	10	4 9/16	1 3/4	2.883	2.162
3 1/2	10 1/4	4 15/16	2	3.008	2.256
3 5/8	10 1/4	4 15/16	2	3.133	2.350
3 3/4	10 1/2	5 5/16	2 1/8	3.217	2.413
3 7/8	10 1/2	5 5/16	2 1/8	3.342	2.506
4	10 3/4	5 5/16	2 1/4	3.467	2.600

Special Taps

Unless otherwise specified:

Fine pitch hand taps 1 1/8" diameter and larger will be made to Table 303.

Use Table 304 for special hand taps under 1/4" diameter whose nominal diameter is not listed in this table.

All special hand taps 1/4" diameter and over, whose nominal diameter is more than .010" over the diameter of any size listed in this table, will be furnished with the length, shank and square dimensions of the next larger size tap.

Special cut and ground thread taps will be made to limits shown in Tables 330 and 331.

(Concluded on following page)

TABLE 302

Hand Taps

(Concluded)

Tolerances

Element	Range	Direction	Tolerance	
			Cut Thread	Ground Thread
Length Overall—A	1/16″ to 1″ incl.	Plus or Minus	1/32″	1/32″
	1 1/16″ to 4″ incl.	Plus or Minus	1/16″	1/16″
Length of Thread—B	1/16″ to 7/32″ incl.	Plus or Minus	3/64″	3/64″
	1/4″ to 1/2″ incl.	Plus or Minus	1/16″	1/16″
	9/16″ to 1 1/2″ incl.	Plus or Minus	3/32″	3/32″
	1 5/8″ to 4″ incl.	Plus or Minus	1/8″	1/8″
Length of Square—C	1/16″ to 1″ incl.	Plus or Minus	1/32″	1/32″
	1 1/16″ to 4″ incl.	Plus or Minus	1/16″	1/16″
Diameter of Shank—D	1/16″ to 7/32″ incl.	Minus	.004″	.0015″
	1/4″ to 5/8″ incl.	Minus	.005″	.0015″
	11/16″ to 1″ incl.	Minus	.005″	.002″
	1 1/16″ to 1 1/2″ incl.	Minus	.007″	.002″
	1 5/8″ to 2″ incl.	Minus	.007″	.003″
	2 1/8″ to 4″ incl.	Minus	.009″	.003″
Size of Square—E	1/16″ to 1/2″ incl.	Minus	.004″	.004″
	9/16″ to 1″ incl.	Minus	.006″	.006″
	1 1/16″ to 2″ incl.	Minus	.008″	.008″
	2 1/8″ to 4″ incl.	Minus	.010″	.010″

Formulae

(Approximate)

Diameter of Shank
- Large Shanks { 1/16″ to 1/8″ Incl. = Diameter of Shank of 1/8″ Tap. / 5/32″ and Larger = Approximate Maximum Major Diam.
- Small Shanks = Basic Major Diameter—(Std. V Pitch x 1.6 to nearest .001″).

Size of Square { 1/16″ to 3/16″ = Diameter of Shank x .78 to nearest .001″. / 7/32″ and Larger = Diameter of Shank x .75 to nearest .001″.

Notes

Cut thread taps sizes smaller than 11/32″ have external center on thread end; sizes 11/32″ and larger have internal center in thread end.

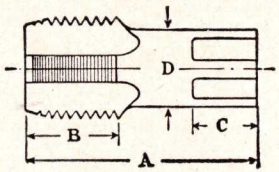
Ground thread taps sizes smaller than 1/4″ have external center on thread end; sizes 1/4″ and larger have internal center in thread end.

Exception: All taps to 3/8″ inclusive having two flutes, three flutes or spiral point have external center on thread end.

For standard thread limits see Tables 325, 326 and 327.

TABLE 303

Special Fine Pitch Hand Taps



Unless otherwise specified, orders covering special hand taps 1⅛″ to 1½″ diameter inclusive having 14 or more threads per inch, and sizes over 1½″ diameter with 10 or more threads per inch, will be filled with taps having general dimensions as shown in the following table:

General Dimensions

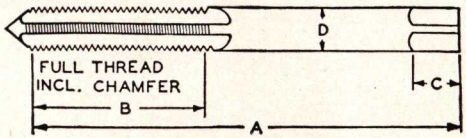
Diameter of Tap Inches	Dimensions—Inches				
	Length Overall A	Length of Full Thread B	Length of Square C	Diameter of Shank D	Size of Square
1⅛	4	1½	⅞	.896	.672
1¼	4	1½	1	1.021	.766
1⅜	4	1½	1	1.108	.831
1½	4	1½	1	1.233	.925
1⅝	5	2	1⅛	1.305	.979
1¾	5	2	1¼	1.430	1.072
1⅞	5	2	1¼	1.519	1.139
2	5	2	1⅜	1.644	1.233
2⅛	5¼	2	1⅜	1.769	1.327
2¼	5¼	2	1⅞	1.894	1.420
2⅜	5¼	2	1⅞	2.019	1.514
2½	5¼	2	1½	2.100	1.575
2⅝	5½	2	1½	2.100	1.575
2¾	5½	2	1½	2.100	1.575
2⅞	5½	2	1½	2.100	1.575
3	5½	2	1½	2.100	1.575
3⅛	5¾	2	1½	2.100	1.575
3¼	5¾	2	1½	2.100	1.575
3⅜	5¾	2	1½	2.100	1.575
3½	5¾	2	1½	2.100	1.575
3⅝	6	2	1¾	2.100	1.575
3¾	6	2	1¾	2.100	1.575
3⅞	6	2	1¾	2.100	1.575
4	6	2	1¾	2.100	1.575

Notes

For tolerances see Table 302.
For standard thread limits see Tables 330 and 331.

TABLE 304

Machine Screw Taps



General Dimensions

Screw Gage No.	Dimensions—Inches				
	Length Overall A	Length of Full Thread B	Length of Square C	Diam. of Shank D	Size of Square E
0	1 5/8	5/16	3/16	.141	.110
1	1 11/16	3/8	3/16	.141	.110
2	1 3/4	7/16	3/16	.141	.110
3	1 13/16	1/2	3/16	.141	.110
4	1 7/8	9/16	3/16	.141	.110
5	1 15/16	5/8	3/16	.141	.110
6	2	11/16	3/16	.141	.110
7	2 1/16	3/4	1/4	.168	.131
8	2 1/8	3/4	1/4	.168	.131
9	2 1/4	13/16	1/4	.194	.152
10	2 3/8	7/8	1/4	.194	.152
12	2 3/8	15/16	9/32	.220	.165
14	2 1/2	1	9/32	.247	.185
16	2 1/2	1 1/16	5/16	.273	.205
18	2 23/32	1 1/16	5/16	.299	.225
20	2 23/32	1 1/8	11/32	.325	.244

Tolerances

Element	Range Screw Gage No.	Direction	Tolerance	
			Cut Thread	Ground Thread
Length Overall—A	0 to 20 incl.	Plus or Minus	1/32″	1/32″
Length of Thread—B	0 to 12 incl.	Plus or Minus	3/64″	3/64″
	14 to 20 incl.	Plus or Minus	1/16″	1/16″
Length of Square—C	0 to 20 incl.	Plus or Minus	1/32″	1/32″
Diameter of Shank—D	0 to 12 incl.	Minus	.004″	.0015″
	14 to 20 incl.	Minus	.005″	.0015″
Size of Square—E	0 to 20 incl.	Minus	.004″	.004″

Formulae

(Approximate)

Diameter of Shank { No. 0 to No. 5 Incl. = Diameter of Shank of No. 6 Tap.
No. 6 to No. 20 Incl. = Approximate Maximum Major Diameter (except No. 7 and No. 9).

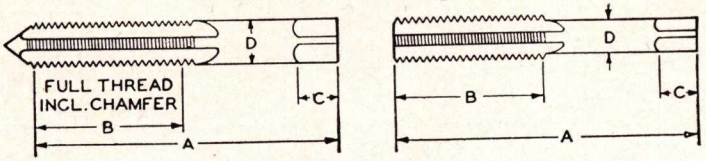
Size of Square { No. 0 to No. 10 Incl. = Diam. of Shank x .78 to nearest .001″.
No. 12 to No. 20 Incl. = Diam. of Shank x .75 to nearest .001″.

Notes

All taps have external center on thread end.
For standard thread limits see Tables 328 and 329.

TABLE 305

Stove Bolt Taps



General Dimensions

Nominal Size of Tap	Length, Inches					
	Overall A	Full Thread B	Square C	Diameter of Shank D	Size of Square E	Corresponding Size Standard Tap Blank
1/8–32	1 15/16	5/8	3/16	.141	.110	..
5/32–28	2 1/8	3/4	1/4	.168	.131	No. 8 M. S.
3/16–24	2 3/8	7/8	1/4	.201	.151	..
7/32–22	2 3/8	15/16	1/4	.228	.171	..
1/4–18	2 1/2	1	9/32	.255	.191	1/4
5/16–18	2 23/32	1 1/8	5/16	.318	.238	5/16
3/8–16	2 15/16	1 1/4	3/8	.381	.286	3/8
7/16–14	3 5/32	1 7/16	13/32	.323	.242	7/16
1/2–13	3 3/8	1 21/32	7/16	.367	.275	1/2

Tolerances

Element	Range	Direction	Tolerance
Length Overall—A	1/8″ to 1/2″ incl.	Plus or Minus	1/32″
Length of Thread—B	1/8″ to 7/32″ incl. 1/4″ to 1/2″ incl.	Plus or Minus Plus or Minus	3/64″ 1/16″
Length of Square—C	1/8″ to 1/2″ incl.	Plus or Minus	1/32″
Diameter of Shank—D	1/8″ to 7/32″ incl. 1/4″ to 1/2″ incl.	Minus Minus	.004″ .005″
Size of Square—E	1/8″ to 1/2″ incl.	Minus	.004″

Formulae

(Approximate)

Diameter of Shank
- Large Shanks
  - 1/8″ = Diameter of Shank of 1/8″ Hand Tap.
  - 5/32″ and Larger = Approximate Maximum Major Diam.
- Small Shanks = Basic Major Diameter—(Std. V Pitch x 1.6 to nearest .001″).

Size of Square
- 1/8″ to 5/32″ Incl. = Diameter of Shank x .78 to nearest .001″.
- 3/16″ and Larger = Diameter of Shank x .75 to nearest .001″.

Notes

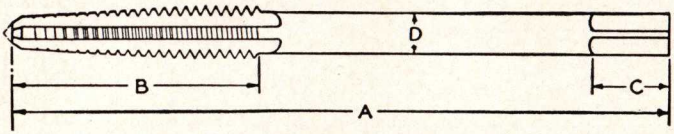
Cut thread taps up to 5/16″ inclusive have external center on thread end; sizes 3/8″ and larger have internal center in thread end.

For standard thread limits see Table 332.

These taps conform to the manufacturers' standard for stove bolts.

TABLE 306

Nut Taps



General Dimensions

Diam. of Tap Inches	Threads per Inch			Dimensions—Inches				
	N. C.	N. F.	N. S.	Length Overall A	Length of Thread B	Length of Square C	Diam. of Shank D	Size of Square E
3/16	..	..	24	4 1/2	1 3/8	1/2	.133	.100
3/16	..	..	32	4 1/2	1	1/2	.133	.100
1/4	20	..	..	5	1 5/8	9/16	.185	.139
1/4	..	28	..	5	1 1/4	9/16	.185	.139
5/16	18	..	..	5 1/2	1 13/16	5/8	.240	.180
5/16	..	24	..	5 1/2	1 3/8	5/8	.240	.180
3/8	16	..	..	6	2	11/16	.294	.220
3/8	..	24	..	6	1 1/2	11/16	.294	.220
7/16	14	..	..	6 1/2	2 3/8	3/4	.345	.259
7/16	..	20	..	6 1/2	1 3/4	3/4	.345	.259
1/2	13	..	..	7	2 1/2	7/8	.400	.300
1/2	..	20	..	7	1 7/8	7/8	.400	.300
9/16	12	..	..	7 1/2	2 3/4	7/8	.450	.337
9/16	..	18	..	7 1/2	2	7/8	.450	.337
5/8	11	..	..	8	3	15/16	.503	.377
5/8	..	18	..	8	2 1/4	15/16	.503	.377
11/16	..	..	11	8 1/2	3	1	.565	.424
11/16	..	..	16	8 1/2	2 1/4	1	.565	.424
3/4	10	..	..	9	3 1/4	1	.616	.462
3/4	..	16	..	9	2 1/2	1	.616	.462
13/16	..	..	10	9 1/2	3 1/4	1 1/16	.679	.509
7/8	9	..	..	10	3 5/8	1 1/16	.727	.545
7/8	..	14	..	10	2 3/4	1 1/16	.727	.545
7/8	..	..	18	10	2 3/4	1 1/16	.727	.545
15/16	..	..	9	10 1/2	3 5/8	1 1/8	.789	.592
1	8	..	..	11	4	1 1/8	.834	.625
1	..	14	..	11	3	1 1/8	.834	.625
1 1/8	7	..	..	11 1/2	4 3/4	1 1/4	.933	.700
1 1/8	..	12	..	11 1/2	3 1/2	1 1/4	.933	.700
1 1/4	7	..	..	12	4 3/4	1 5/16	1.058	.793
1 1/4	..	12	..	12	3 1/2	1 5/16	1.058	.793
1 3/8	6	..	..	12 1/2	5 3/8	1 3/8	1.153	.865
1 3/8	..	12	..	12 1/2	4	1 3/8	1.153	.865
1 1/2	6	..	..	13	5 3/8	1 1/2	1.278	.958
1 1/2	..	12	..	13	4	1 1/2	1.278	.958

(Concluded on following page)

TABLE 306

Nut Taps

(Concluded)

General Dimensions

Diam. of Tap Inches	Threads per Inch			Dimensions—Inches				
	N. C.	N. F.	N. S.	Length Over-all A	Length of Thread B	Length of Square C	Diameter of Shank D	Size of Square E
1 5/8	...	...	5 1/2	13 1/2	5 1/2	1 9/16	1.383	1.037
1 3/4	5	...	...	14	5 1/2	1 5/8	1.484	1.113
1 7/8	...	...	5	14 1/2	5 1/2	1 11/16	1.609	1.207
2	4 1/2	...	...	15	6 1/8	1 3/4	1.705	1.279
2 1/8	...	...	4 1/2	15 1/2	6 1/8	1 13/16	1.828	1.371
2 1/4	4 1/2	...	...	16	6 1/8	1 7/8	1.953	1.465
2 3/8	...	...	4	16 1/2	6 7/8	2	2.042	1.531
2 1/2	4	...	...	17	6 7/8	2	2.167	1.625

Tolerances

Element	Range	Direction	Tolerance: Cut Thread	Tolerance: Ground Thread
Length Overall—A	3/16" to 1" incl. 1 1/8" to 2 1/2" incl.	Plus or Minus Plus or Minus	1/16" 3/32"	1/16" 3/32"
Length of Thread—B	3/16" to 1/2" incl. 9/16" to 1 1/2" incl. 1 5/8" to 2 1/2" incl.	Plus or Minus Plus or Minus Plus or Minus	1/16" 3/32" 1/8"	1/16" 3/32" 1/8"
Length of Square—C	3/16" to 5/8" incl. 11/16" to 1 1/2" incl. 1 5/8" to 2 1/2" incl.	Plus or Minus Plus or Minus Plus or Minus	1/32" 3/64" 1/16"	1/32" 3/64" 1/16"
Diameter of Shank—D	3/16" to 1/2" incl. 9/16" to 1" incl. 1 1/8" to 2" incl. 2 1/8" to 2 1/2" incl.	Minus Minus Minus Minus	.005" .006" .008" .010"	.005" .006" .008" .010"
Size of Square—E	3/16" to 1/2" incl. 9/16" to 1" incl. 1 1/8" to 2" incl. 2 1/8" to 2 1/2" incl.	Minus Minus Minus Minus	.004" .006" .008" .010"	.004" .006" .008" .010"

Formulae

(Approximate)

Diam. of Shank

3/16" to 1/2" Incl. = N. C. Basic Root Diam.
9/16" to 1" Incl. = N. C. Basic Root Diam. Minus .004".
1 1/8" to 2" Incl. = N. C. Basic Root Diam. Minus .006".
2 1/8" to 2 1/2" Incl. = N. C. Basic Root Diam. Minus .008".

Size of Square = Diameter of Shank x .75 to nearest .001".

Notes

Cut thread taps up to 13/32" inclusive have external center on thread end; sizes 7/16" and larger have internal center in thread end.

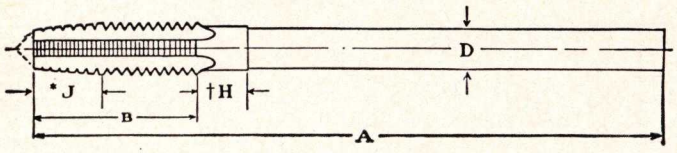
Ground thread taps up to 15/64" inclusive have external center on thread end; sizes 1/4" and larger have internal center in thread end.

For standard thread limits see Tables 325 and 326.

TABLE 307

Tapper Taps

Fractional Sizes



General Dimensions

Diam. of Tap Inches	Threads per Inch			Dimensions—Inches			
	N. C.	N. F.	N. S.	Length Over-all A	Length of Thread B	Diam. of Shank D	Nut Guide H
1/4	20	..	..	12	1 1/4	.185	..
1/4	..	28	..	12	1	.185	1/4
5/16	18	..	..	12	1 3/8	.240	..
5/16	..	24	..	12	1 1/16	.240	5/16
3/8	16	..	..	12	1 9/16	.294	..
3/8	..	24	..	12	1 3/16	.294	3/8
7/16	14	..	..	12	1 13/16	.345	..
7/16	..	20	..	12	1 3/8	.345	7/16
1/2	13	..	..	12 and 15	1 7/8	.400	..
1/2	..	20	..	12 and 15	1 3/8	.400	1/2
9/16	12	..	..	12 and 15	2 1/8	.450	..
9/16	..	18	..	12 and 15	1 9/16	.450	9/16
5/8	11	..	..	12 and 15	2 5/16	.503	..
5/8	..	18	..	12 and 15	1 11/16	.503	5/8
11/16	..	..	11	12 and 15	2 5/16	.565	..
11/16	..	..	16	12 and 15	1 11/16	.565	5/8
3/4	10	..	..	12 and 15	2 1/2	.616	..
3/4	..	16	..	12 and 15	1 3/4	.616	3/4
13/16	..	..	10	12 and 15	2 1/2	.679	..
7/8	9	..	..	12 and 15	2 3/4	.727	..
7/8	..	14	..	12 and 15	1 7/8	.727	7/8
7/8	..	..	18	12 and 15	1 7/8	.727	7/8
15/16	..	..	9	12 and 15	2 3/4	.789	..
1	8	..	..	12 and 15	3 1/8	.834	..
1	..	14	..	12 and 15	2 1/8	.834	1

(Concluded on following page)

TABLE 307

Tapper Taps

Fractional Sizes
(Concluded)

General Dimensions

Diameter of Tap Inches	Threads per Inch			Dimensions—Inches			
	N. C.	N. F.	N. S.	Length Over-all A	Length of Thread B	Diameter of Shank D	Nut Guide H
1 1/8	7	..	...	15	3 1/2	.933	...
1 1/8	...	12	...	15	2 3/8	.933	1 1/8
1 1/4	7	..	...	15	3 1/2	1.058	...
1 1/4	...	12	...	15	2 3/8	1.058	1 1/8
1 3/8	6	..	...	15	4	1.153	...
1 3/8	...	12	...	15	2 5/8	1.153	1 3/8
1 1/2	6	..	...	15	4	1.278	...
1 1/2	...	12	...	15	2 5/8	1.278	1 3/8
1 5/8	...	..	5 1/2	15	4	1.383	...
1 3/4	5	..	...	15	4 1/2	1.484	...
1 7/8	...	..	5	15	4 1/2	1.609	...
2	4 1/2	..	...	15	4 1/2	1.705	...

Tolerances

Element	Range	Direction	Tolerance	
			Cut Thread	Ground Thread
Length Overall—A	1/4" to 1" incl. 1 1/8" to 2" incl.	Plus or Minus Plus or Minus	1/8" 5/16"	1/16" 5/16"
Length of Thread—B	1/4" to 1/2" incl. 9/16" to 1 1/2" incl. 1 5/8" to 2" incl.	Plus or Minus Plus or Minus Plus or Minus	1/16" 3/32" 1/8"	1/16" 3/32" 1/8"
Diameter of Shank—D	1/4" to 1/2" incl. 9/16" to 1" incl. 1 1/8" to 2" incl.	Minus Minus Minus	.005" .006" .008"	.005" .006" .008"

Formulae
(Approximate)

Diam. of Shank
- 1/4" to 1/2" Incl. = N. C. Basic Root Diameter.
- 9/16" to 1" Incl. = N. C. Basic Root Diam. Minus .004".
- 1 1/8" to 2" Incl. = N. C. Basic Root Diam. Minus .006".

Notes

A nut guide "H," approximately equal in diameter to the basic root diameter, may be furnished on taps having threads N. F. and finer.

*The chamfer "J" is 11 to 12 threads for National Coarse Thread taps and 15 to 17 threads for National Fine Thread taps.

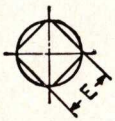
All taps up to 13/32" inclusive have external center on thread end; sizes 7/16" and larger have internal center in thread end.

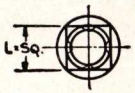
Tapper taps are furnished with plain round shank unless otherwise ordered. For other styles of shanks see Table 308.

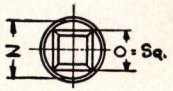
For standard thread limits see Tables 325 and 326.

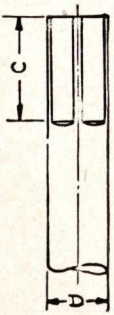
TABLE 308

Tapper Tap Shanks

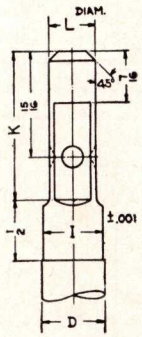




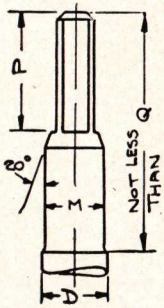




Plain Round or Squared



Acme Improved Type "C"



National Interchangeable Ring Lock

General Dimensions

Diam. of Tap Inches	Dimensions—Inches										
	C	D	E	I	K	L	M	N	O	P	Q
1/4	9/16	.185	.139	.177	1 5/16	.147	.185	.170	.134	11/16	2 1/2
5/16	5/8	.240	.180	.232	1 5/16	.188	.240	.221	.165	11/16	2 1/2
3/8	11/16	.294	.220	.286	1 5/16	.240	.290	.271	.208	11/16	2 1/2
7/16	3/4	.345	.259	.336	1 5/16	.290	.340	.320	.240	11/16	2 1/2
1/2	7/8	.400	.300	.390	1 5/16	.320	.400	.374	.286	1	3 1/4
9/16	7/8	.450	.337	.446	1 5/16	.350	.450	.422	.318	1	3 1/4
5/8	15/16	.503	.377	.500	1 5/16	.390	.500	.450	.350	1	3 1/4
11/16	1	.565	.424	.554	1 5/16	.430	.565	.515	.390	1 5/16	3 3/4
3/4	1	.616	.462	.610	1 5/16	.480	.615	.540	.422	1 5/16	3 3/4
13/16	1 1/16	.679	.509	.659	1 5/16	.540	.675	.620	.465	1 5/16	3 3/4
7/8	1 1/16	.727	.545	.722	1 5/16	.540	.720	.630	.500	1 5/16	3 3/4
15/16	1 1/8	.789	.592	.774	1 5/16	.580	.785	.727	.545	1 5/16	3 3/4
1	1 1/8	.834	.625	.829	1 5/8	.650	.825	.730	.574	1 5/16	3 3/4
1 1/8	1 1/4	.933	.700	.929	1 5/8	.710	.930	.855	.667	1 3/4	4 1/2
1 1/4	1 5/16	1.058	.793	1.053	1 5/8	.780	1.055	.975	.760	1 3/4	4 1/2
1 3/8	1 3/8	1.153	.855	1.149	1 5/8	.850	1.150	1.055	.824	1 3/4	4 1/2
1 1/2	1 1/2	1.278	.958	1.269	1 5/8	.950	1.275	1.195	.917	1 3/4	4 1/2
1 5/8	1 9/16	1.383	1.037	1.328	1 5/8	1.000	1.375	1.319	.995	2 1/16	4 3/4
1 3/4	1 5/8	1.484	1.113	1.436	1 5/8	1.062	1.480	1.421	1.070	2 1/16	4 3/4
1 7/8	1 11/16	1.609	1.207	1.594	1 5/8	1.187	1.605	1.548	1.167	2 1/16	4 3/4
2	1 3/4	1.705	1.279	1.696	1 5/8	1.250	1.700	1.641	1.230	2 1/16	4 3/4

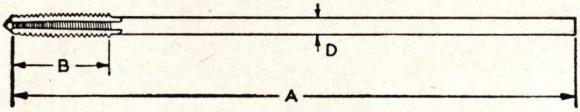
Note

For tolerances on size of squares see Table 306.

TABLE 309

Tapper Taps

Machine Screw Sizes



General Dimensions

Screw Gage No.	Threads per Inch			Dimensions—Inches		
	N.C.	N.F.	N.S.	Length Over-all A	Length of Thread B	Diameter of Shank D
2	56	..	..	5	11/32	.063
2	..	64	..	5	5/16	.066
3	48	..	..	5	13/32	.072
3	..	56	..	5	11/32	.076
4	..	..	36	6	9/16	.076
4	40	..	..	6	1/2	.080
4	..	48	..	6	13/32	.085
5	40	..	..	8	1/2	.093
5	..	44	..	8	7/16	.096
6	32	..	..	8	5/8	.097
6	..	40	..	8	1/2	.106
8	32	..	..	9	5/8	.123
8	..	36	..	9	9/16	.128
10	24	..	..	11	13/16	.136
10	..	32	..	11	5/8	.149
12	24	..	..	11	13/16	.162
12	..	28	..	11	23/32	.170
14	..	..	20	11	1	.177
14	..	..	24	11	13/16	.188

Tolerances

Element	Range	Direction	Tolerance
Length Overall (A)	Sizes 2 to 14 incl.	Plus or Minus	1/16"
Length of Thread (B)	Sizes 2 to 14 incl.	Plus or Minus	3/64"
Diameter of Shank (D)	Sizes 2 to 14 incl.	Minus	.005"

Formulae

(Approximate)

Diameter of Shank = National Basic Root Diameter to nearest .001".

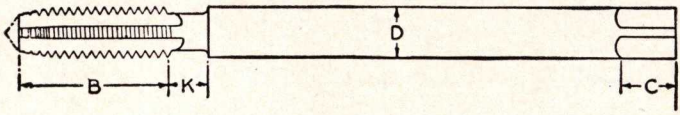
Notes

For standard thread limits see Table 328.

The chamfer is 11 to 12 threads.

TABLE 310

Pulley Taps



General Dimensions

Diameter of Tap Inches	Dimensions—Inches					
	Length Overall A	Length of Thread B	Length of Square C	Diameter of Shank D	Size of Square E	Length of Neck K
1/4	6, 8	1	5/16	.255	.191	3/8
5/16	6, 8	1 1/8	3/8	.318	.238	3/8
3/8	6, 8, 10	1 1/4	7/16	.381	.286	3/8
7/16	6, 8, 10, 12	1 7/16	1/2	.444	.333	7/16
1/2	6, 8, 10, 12	1 21/32	9/16	.507	.380	1/2
5/8	6, 8, 10, 12, 14	1 13/16	11/16	.633	.475	5/8
3/4	10, 12, 14	2	3/4	.759	.569	3/4

Tolerances

Element	Range	Direction	Tolerance	
			Cut Thread	Ground Thread
Length Overall—A	1/4" to 3/4" incl.	Plus or Minus	1/16"	1/16"
Length of Thread—B	1/4" to 3/4" incl.	Plus or Minus	1/16"	1/16"
Length of Square—C	1/4" to 3/4" incl.	Plus or Minus	1/32"	1/32"
Diameter of Shank—D	1/4" to 3/4" incl.	Minus	.005"	.005"
Size of Square—E	1/4" to 1/2" incl.	Minus	.004"	.004"
	5/8" to 3/4" incl.	Minus	.006"	.006"

Formulae

(Approximate)

Diameter of Shank = Maximum Major Diameter.

Size of Square = Diameter of Shank x .75 to nearest .001".

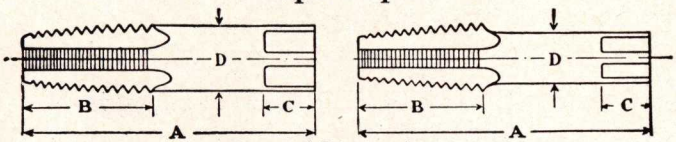
Notes

Cut thread taps up to 5/16" have external center on thread end; sizes 3/8" and larger have internal center in thread end.

Ground thread taps have internal center in thread end.

For standard thread limits see Tables 325 and 326.

TABLE 311
Pipe Taps



General Dimensions

Nominal Size Inches	Dimensions—Inches				
	Length Overall A	Length of Thread B	Length of Square C	Diameter of Shank D	Size of Square E
1/16	2 1/8	11/16	3/16	.3125	.234
1/8	2 1/8	3/4	3/16	.3125	.234
1/8	2 1/8	3/4	1/4	.4375	.328
1/4	2 7/16	1 1/16	7/16	.5625	.421
5/8	2 9/16	1 1/16	1/2	.7000	.531
1/2	3 1/8	1 3/8	5/8	.6875	.515
5/8	3 3/16	1 3/8	5/8	.8125	.594
3/4	3 1/4	1 3/8	11/16	.9063	.679
7/8	3 1/2	1 9/16	3/4	1.0937	.812
1	3 3/4	1 3/4	15/16	1.1250	.843
1 1/4	4	1 3/4	15/16	1.3125	.984
1 1/2	4 1/4	1 3/4	1	1.5000	1.125
1 3/4	4 3/8	1 3/4	1 1/16	1.6250	1.218
2	4 1/2	1 3/4	1 1/8	1.8750	1.406
2 1/4	5	2 1/8	1 3/16	2.0000	1.500
2 1/2	5 1/2	2 3/16	1 1/4	2.2500	1.687
2 3/4	5 3/4	2 3/16	1 5/16	2.3750	1.781
3	6	2 5/8	1 3/8	2.6250	1.968
3 1/4	6 1/4	2 5/8	1 7/16	2.7500	2.062
3 1/2	6 1/2	2 11/16	1 1/2	2.8125	2.108
3 3/4	6 5/8	2 11/16	1 9/16	2.8750	2.156
4	6 3/4	2 3/4	1 5/8	3.0000	2.250

Tolerances

Element	Range	Direction	Tolerance	
			Cut Thread	Ground Thread
Length Overall—A	1/16″ to 3/4″ incl.	Plus or Minus	1/32″	1/32″
	7/8″ to 4″ incl.	Plus or Minus	1/16″	1/16″
Length of Thread—B	1/16″ to 3/4″ incl.	Plus or Minus	1/16″	1/16″
	7/8″ to 1 1/4″ incl.	Plus or Minus	3/32″	3/32″
	1 1/2″ to 4″ incl.	Plus or Minus	1/8″	1/8″
Length of Square—C	1/16″ to 3/4″ incl.	Plus or Minus	1/32″	1/32″
	7/8″ to 4″ incl.	Plus or Minus	1/16″	1/16″
Diameter of Shank—D	1/16″ to 1/8″ incl.	Minus	.0070″	.0015″
	1/4″ to 1/2″ incl.	Minus	.0070″	.0020″
	5/8″ to 1″ incl.	Minus	.0090″	.0020″
	1 1/4″ to 4″ incl.	Minus	.0090″	.0030″
Size of Square—E	1/16″ to 1/8″ incl.	Minus	.0040″	.0040″
	1/4″ to 3/4″ incl.	Minus	.0060″	.0060″
	7/8″ to 4″ incl.	Minus	.0080″	.0080″

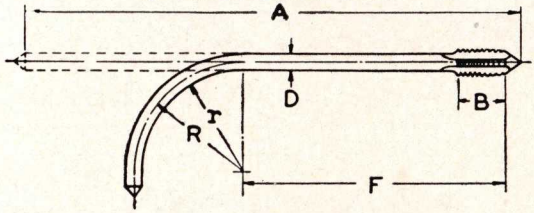
Note

For standard thread limits see Tables 334, 335 and 338.

TABLE 312

Bent Shank Tapper Taps

Machine Screw Sizes



General Dimensions

Screw Gage No.	Basic Major Diam. Inches	Size of Mach.	Threads per Inch N.C.	Threads per Inch N.F.	Threads per Inch N.S.	No. Flutes of	Dimensions—Inches A	B	D	F	R	r
4	.112	1/8″	..	..	36	3	3 9/16	11/32	.076	1 25/32	7/8	.837
4	.112	1/8″	40	..	..	3	3 9/16	5/16	.080	1 25/32	7/8	.836
4	.112	1/8″	..	48	..	3	3 9/16	1/4	.085	1 23/32	7/8	.832
5	.125	1/8″	40	..	..	3	3 9/16	5/16	.093	1 25/32	7/8	.829
5	.125	1/8″	..	44	..	3	3 9/16	9/32	.095	1 25/32	7/8	.827
6	.138	1/8″	32	..	..	3	3 9/16	3/8	.095	1 25/32	7/8	.827
6	.138	1/8″	..	40	..	3	3 9/16	5/16	.104	1 25/32	7/8	.823
6	.138	3/16″	32	..	..	3	4 15/16	3/8	.095	2 15/32	1 3/16	1.140
6	.138	3/16″	..	40	..	3	4 15/16	5/16	.104	2 15/32	1 3/16	1.136
8	.164	3/16″	32	..	..	3	4 15/16	3/8	.121	2 7/16	1 3/16	1.127
8	.164	3/16″	..	36	..	3	4 15/16	11/32	.126	2 7/16	1 3/16	1.125
10	.190	3/16″	24	..	..	3	4 15/16	1/2	.134	2 13/32	1 3/16	1.121
10	.190	3/16″	..	32	..	3	4 15/16	3/8	.147	2 13/32	1 3/16	1.114
12	.216	3/16″	24	..	..	3	4 15/16	1/2	.157	2 3/8	1 3/16	1.109
12	.216	3/16″	..	28	..	3	4 15/16	7/16	.165	2 3/8	1 3/16	1.105
6	.138	1/4″	32	..	..	3	6 1/2	3/8	.095	3 25/32	1 1/4	1.202
6	.138	1/4″	..	40	..	3	6 1/2	5/16	.104	3 25/32	1 1/4	1.198
8	.164	1/4″	32	..	..	3	6 1/2	3/8	.121	3 3/4	1 1/4	1.190
8	.164	1/4″	..	36	..	3	6 1/2	11/32	.126	3 3/4	1 1/4	1.187
10	.190	1/4″	24	..	..	3	6 1/2	1/2	.134	3 25/32	1 1/4	1.183
10	.190	1/4″	..	32	..	3	6 1/2	3/8	.147	3 23/32	1 1/4	1.176
12	.216	1/4″	24	..	..	3	6 1/2	1/2	.157	3 11/16	1 1/4	1.171
12	.216	1/4″	..	28	..	3	6 1/2	7/16	.165	3 11/16	1 1/4	1.167
14	.242	1/4″	..	..	20	3	6 1/2	19/32	.172	3 21/32	1 1/4	1.164
14	.242	1/4″	..	..	24	3	6 1/2	1/2	.183	3 21/32	1 1/4	1.158

Tolerances

Element	Range Screw Gage No.	Direction	Tolerance
Length Overall—A	4 to 14 incl.	Plus	1/16″
Length of Thread—B	4 to 14 incl.	Plus or Minus	3/64″
Diameter of Shank—D	4 to 14 incl.	Minus	.005″

Formulae

(Approximate)

Diameter of Shank
- No. 5 and smaller = National Basic Root Diameter.
- No. 6 to No. 10 incl. = National Basic Root Diameter minus .002″.
- No. 12 and larger = National Basic Root Diameter minus .005″.

All to nearest .001″.

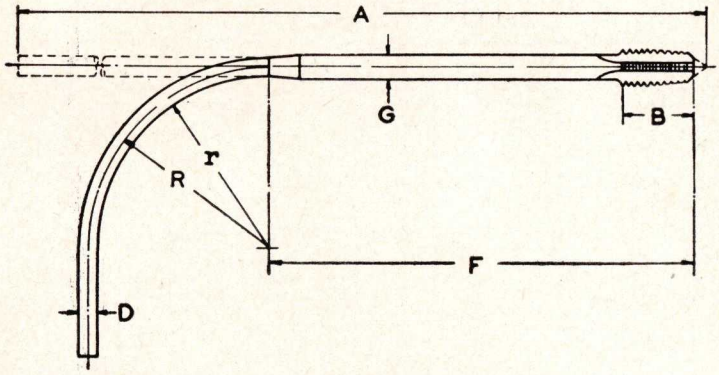
Notes

All taps have external center on thread end.
For standard thread limits see Table 328.

TABLE 313

Bent Shank Tapper Taps

Fractional Sizes



General Dimensions

Diam. of Tap Inches	Size of Mach.	Threads per Inch N.C.	N.F.	N.S.	S.B.	No. of Flutes	Dimensions—Inches A	B	D	F	G	R	r
5/32	3/16"	..	..	..	28	3	4 15/16	7/16	.128	2 7/16	..	1 3/16	1.124
3/16	3/16"	..	..	..	24	3	4 15/16	1/2	.153	2 7/16	..	1 3/16	1.111
1/8	1/4"	..	..	40	..	3	6 1/2	5/16	.093	3 3/4	..	1 1/4	1.204
5/32	1/4"	..	..	..	28	3	6 1/2	7/16	.128	3 3/4	..	1 1/4	1.186
3/16	1/4"	..	..	24	..	3	6 1/2	1/2	.133	3 3/4	..	1 1/4	1.183
3/16	1/4"	..	..	32	..	3	6 1/2	5/8	.147	3 3/4	..	1 1/4	1.176
3/16	1/4"	..	..	..	24	3	6 1/2	1/2	.153	3 3/4	..	1 1/4	1.174
1/4	1/4"	20	..	..	..	3	6 1/2	5/8	.180	3 21/32	..	1 1/4	1.160
1/4	1/4"	..	28	..	..	3	6 1/2	5/8	.194	3 5/8	..	1 1/4	1.153
1/4	1/4"	..	..	..	18	3	6 1/2	11/16	.200	3 11/16	..	1 1/4	1.150
5/16	1/4"	18	..	..	..	3	6 1/2	11/16	.235	3 5/8	..	1 1/4	1.133
5/16	1/4"	..	24	..	..	3	6 1/2	5/8	.245	3 5/8	..	1 1/4	1.128
1/4	3/8"	20	..	..	..	3	8 3/4	5/8	.180	4 17/32	..	1 7/8	1.785
1/4	3/8"	..	28	..	..	3	8 3/4	5/8	.194	4 1/2	..	1 7/8	1.778
5/16	3/8"	18	..	..	..	3	8 3/4	3/4	.235	4 15/32	..	1 7/8	1.757
5/16	3/8"	..	24	..	..	3	8 3/4	3/4	.245	4 7/16	..	1 7/8	1.752
3/8	3/8"	16	..	..	..	3	8 3/4	13/16	.289	4 13/32	..	1 7/8	1.730
3/8	3/8"	..	24	..	..	3	8 3/4	3/4	.289	4 3/8	.321	1 7/8	1.723
3/8	1/2"	16	..	..	..	3	12	13/16	.289	5 29/32	..	2 1/2	2.355
3/8	1/2"	..	24	..	..	3	12	3/4	.289	5 7/8	.321	2 1/2	2.355
7/16	1/2"	14	..	..	..	3	12	1 5/16	.340	6 5/32	..	2 1/2	2.330
7/16	1/2"	..	20	..	..	3	12	1 1/16	.340	6 1/16	.373	2 1/2	2.330
1/2	1/2"	13	..	..	..	3	12	1 5/16	.395	6 1/16	..	2 1/2	2.302
1/2	1/2"	..	20	..	..	3	12	1 1/16	.395	6 1/32	.435	2 1/2	2.302

(Concluded on following page)

TABLE 313

Bent Shank Tapper Taps

Fractional Sizes

(Concluded)

General Dimensions

Diam. of Tap Inches	Size of Mach.	Threads per Inch				No. of Flutes	Dimensions—Inches						
		N.C.	N.F.	N.S.	S.B.		A	B	D	F	G	R	r
9/16	5/8″	12	..	..	..	3	15	1 7/16	.449	7 9/32	..	3 3/4	3.525
9/16	5/8″	..	18	..	..	3	15	1 5/16	.449	7 1/4	.490	3 3/4	3.525
5/8	5/8″	11	..	..	..	3	15	1 5/8	.502	7 1/4	..	3 3/4	3.499
5/8	5/8″	..	18	..	..	3	15	1 5/16	.502	7 1/4	.553	3 3/4	3.499
3/4	5/8″	*10	..	..	..	3	15	1 13/16	.605	7 3/16	..	3 3/4	3.447
3/4	5/8″	..	16	..	..	3	15	1 5/8	.605	7 3/16	.669	3 3/4	3.447
3/4	7/8″	10	..	..	..	3	18 7/16	1 13/16	.605	8 1/2	..	4 1/2	4.197
3/4	7/8″	..	16	..	..	3	18 7/16	1 5/8	.605	8 1/2	.669	4 1/2	4.197
7/8	7/8″	9	..	..	..	3	18 7/16	1 15/16	.716	8 7/16	..	4 1/2	4.142
7/8	7/8″	..	14	..	..	3	18 7/16	1 3/4	.716	8 7/16	.782	4 1/2	4.142
1	7/8″	8	..	..	..	3	18 7/16	2 3/16	.823	8 13/32	..	4 1/2	4.088
1	7/8″	..	14	..	..	3	18 7/16	1 3/4	.823	8 13/32	.907	4 1/2	4.088

* Recommended only for thin nuts.

Tolerances

Element	Range	Direction	Tolerance	
			Cut Thread	Ground Thread
Length Overall—A	1/8″ and 3/16″	Plus	1/16″	1/16″
	1/4″ to 1″ incl.	Plus	1/8″	1/8″
Length of Thread—B	1/8″ to 1/2″ incl.	Plus or Minus	1/16″	1/16″
	9/16″ to 1″ incl.	Plus or Minus	3/32″	3/32″
Diameter of Shank—D	1/8″ to 1/2″ incl.	Minus	.005″	.005″
	9/16″ to 1″ incl.	Minus	.006″	.006″

Formulae

(Approximate)

Diameter of Shank:

- National Coarse Series
  - 5/8″ and under = Basic Root Diameter minus .005″.
  - 3/4″ and over = Basic Root Diameter minus .015″ (to nearest .001″).
- National Fine Series = For 1/4″, and 5/16″ sizes only, 95% of Basic Root Diameter. 3/8″ and larger, same shank diameter as National Coarse tap of corresponding size.
- National Special Series = Basic Root Diameter.
- Stove Bolt = Basic Root Diameter + .003″.

Diameter of Nut Guide

- National Coarse Series = None.
- National Fine Series = None for 1/4″ and 5/16″ sizes. 3/8″ and larger, Basic Root Diameter to nearest .001″.

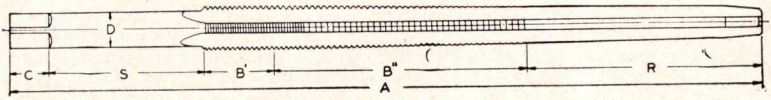
Notes

All taps up to 3/8″ inclusive have external center on thread end; sizes 7/16″ and larger have internal center in thread end.

For standard thread limits see Tables 332, 336 and 339.

TABLE 314

Staybolt Taps



General Dimensions

Diam. of Tap Inches	Dimensions—Inches							
	Length Over-all A	Length of Straight Thread B′	Length of Taper Thread B″	Length of Square C	Diam. of Shank D	Size of Square E	Length of Reamer R	Length of Shank S
7/8	24	2	6	1	.750	5/8	7	8
7/8	27	2	6 1/2	1	.750	5/8	7 1/2	10
15/16	24	2	6	1	.812	5/8	7	8
15/16	27	2	6 1/2	1	.812	5/8	7 1/2	10
1	24	2	6	1	.875	5/8	7	8
1	27	2	6 1/2	1	.875	5/8	7 1/2	10
1 1/16	24	2	6	1	.937	5/8	7	8
1 1/16	27	2	6 1/2	1	.937	5/8	7 1/2	10
1 1/8	24	2	6	1	1.000	3/4	7	8
1 1/8	27	2	6 1/2	1	1.000	3/4	7 1/2	10
1 3/16	24	2	6	1	1.062	3/4	7	8
1 3/16	27	2	6 1/2	1	1.062	3/4	7 1/2	10
1 1/4	24	2	6	1	1.125	3/4	7	8
1 1/4	27	2	6 1/2	1	1.125	3/4	7 1/2	10
1 5/16	24	2	6	1	1.187	3/4	7	8
1 5/16	27	2	6 1/2	1	1.187	3/4	7 1/2	10
1 3/8	24	2	6	1	1.250	1	7	8
1 3/8	27	2	6 1/2	1	1.250	1	7 1/2	10
1 7/16	24	2	6	1	1.312	1	7	8
1 7/16	27	2	6 1/2	1	1.312	1	7 1/2	10
1 1/2	24	2	6	1	1.375	1	7	8
1 1/2	27	2	6 1/2	1	1.375	1	7 1/2	10

Tolerances

Element	Range	Direction	Tolerance
Length Overall—A	7/8″ to 1 1/2″ incl.	Plus or Minus	3/16″
Lengths B′, B″ or R (not accumulative)	7/8″ to 1 1/2″ incl.	Plus or Minus	1/8″
Length of Square—C	7/8″ to 1 1/2″ incl.	Plus or Minus	1/16″
Diameter of Shank—D	7/8″ to 1 1/2″ incl.	Minus	.007″
Size of Square—E	7/8″ to 1 1/2″ incl.	Minus	.008″

Notes

All taps have internal center in reamer end.
For standard thread limits see Table 333.

TABLE 325

Fractional Size Taps

Cut Thread—American National Form

Thread Limits

Size	Threads per Inch			Major Diameter			Pitch Diameter		
	N.C.	N.F.	N.S.	Basic	Minimum	Maximum	Basic	Minimum	Maximum
1/16	..	..	64	.0625	.0635	.0650	.0524	.0526	.0536
5/64	..	..	60	.0781	.0792	.0807	.0673	.0675	.0685
3/32	..	..	48	.0938	.0951	.0966	.0803	.0805	.0815
3/32	..	..	50	.0938	.0951	.0966	.0808	.0810	.0820
7/64	..	..	48	.1094	.1107	.1127	.0959	.0961	.0976
1/8	..	..	40	.1250	.1266	.1286	.1088	.1090	.1105
9/64	..	..	40	.1406	.1422	.1442	.1244	.1246	.1261
5/32	..	..	32	.1563	.1585	.1605	.1360	.1365	.1380
5/32	..	..	36	.1563	.1580	.1600	.1382	.1384	.1399
3/16	..	..	24	.1875	.1903	.1923	.1604	.1609	.1624
3/16	..	..	32	.1875	.1897	.1917	.1672	.1677	.1692
7/32	..	..	24	.2188	.2216	.2236	.1917	.1922	.1937
7/32	..	..	32	.2188	.2210	.2230	.1985	.1990	.2005
1/4	20	..	..	.2500	.2532	.2557	.2175	.2180	.2200
1/4	..	..	24	.2500	.2528	.2553	.2229	.2234	.2254
1/4	..	..	27	.2500	.2525	.2550	.2259	.2264	.2284
1/4	..	28	..	.2500	.2524	.2549	.2268	.2273	.2288
1/4	..	..	32	.2500	.2522	.2547	.2297	.2302	.2317
5/16	18	..	..	.3125	.3160	.3185	.2764	.2769	.2789
5/16	..	..	20	.3125	.3157	.3182	.2800	.2805	.2825
5/16	..	24	..	.3125	.3153	.3178	.2854	.2859	.2874
5/16	..	..	27	.3125	.3150	.3175	.2884	.2889	.2904
5/16	..	..	32	.3125	.3147	.3172	.2922	.2927	.2942
3/8	16	..	..	.3750	.3789	.3814	.3344	.3349	.3369
3/8	..	..	20	.3750	.3782	.3807	.3425	.3430	.3450
3/8	..	24	..	.3750	.3778	.3803	.3479	.3484	.3499
3/8	..	..	27	.3750	.3775	.3800	.3509	.3514	.3529
7/16	14	..	..	.4375	.4419	.4449	.3911	.3916	.3941
7/16	..	20	..	.4375	.4407	.4437	.4050	.4055	.4075
7/16	..	..	24	.4375	.4403	.4433	.4104	.4109	.4129
7/16	..	..	27	.4375	.4400	.4430	.4134	.4139	.4159
1/2	..	..	12	.5000	.5050	.5080	.4459	.4464	.4489
1/2	13	..	..	.5000	.5047	.5077	.4500	.4505	.4530
1/2	..	20	..	.5000	.5032	.5062	.4675	.4680	.4700
1/2	..	..	24	.5000	.5028	.5058	.4729	.4734	.4754
1/2	..	..	27	.5000	.5025	.5055	.4759	.4764	.4784
9/16	12	..	..	.5625	.5675	.5705	.5084	.5089	.5114
9/16	..	18	..	.5625	.5660	.5690	.5264	.5269	.5289
9/16	..	..	27	.5625	.5650	.5680	.5384	.5389	.5409
5/8	11	..	..	.6250	.6304	.6334	.5660	.5665	.5690
5/8	..	..	12	.6250	.6300	.6330	.5709	.5714	.5739
5/8	..	18	..	.6250	.6285	.6315	.5889	.5894	.5914

(Continued on following page)

TABLE 325

Fractional Size Taps

Cut Thread—American National Form

(Continued)

Thread Limits

Size	Threads per Inch			Major Diameter			Pitch Diameter		
	N.C.	N.F.	N.S.	Basic	Minimum	Maximum	Basic	Minimum	Maximum
5/8	..	..	27	.6250	.6275	.6305	.6009	.6014	.6034
11/16	..	..	11	.6875	.6929	.6969	.6285	.6290	.6320
11/16	..	..	16	.6875	.6914	.6954	.6469	.6474	.6499
3/4	10	..	..	.7500	.7559	.7599	.6850	.6855	.6885
3/4	..	..	12	.7500	.7550	.7590	.6959	.6964	.6994
3/4	..	16	..	.7500	.7539	.7579	.7094	.7099	.7124
3/4	..	..	27	.7500	.7525	.7565	.7259	.7264	.7289
7/8	9	..	..	.8750	.8820	.8860	.8028	.8038	.8068
7/8	..	..	12	.8750	.8805	.8845	.8209	.8219	.8249
7/8	..	14	..	.8750	.8799	.8839	.8286	.8296	.8321
7/8	..	..	18	.8750	.8790	.8830	.8389	.8399	.8424
7/8	..	..	27	.8750	.8780	.8820	.8509	.8519	.8544
1	8	..	..	1.0000	1.0078	1.0118	.9188	.9198	.9228
1	..	..	12	1.0000	1.0055	1.0095	.9459	.9469	.9499
1	..	14	..	1.0000	1.0049	1.0089	.9536	.9546	.9571
1	..	..	27	1.0000	1.0030	1.0070	.9759	.9769	.9794
1 1/8	7	..	..	1.1250	1.1337	1.1382	1.0322	1.0332	1.0367
1 1/8	..	12	..	1.1250	1.1305	1.1350	1.0709	1.0719	1.0749
1 1/4	7	..	..	1.2500	1.2587	1.2632	1.1572	1.1582	1.1617
1 1/4	..	12	..	1.2500	1.2555	1.2600	1.1959	1.1969	1.1999
1 3/8	6	..	..	1.3750	1.3850	1.3895	1.2667	1.2677	1.2712
1 3/8	..	12	..	1.3750	1.3805	1.3850	1.3209	1.3219	1.3249
1 1/2	6	..	..	1.5000	1.5100	1.5145	1.3917	1.3927	1.3962
1 1/2	..	12	..	1.5000	1.5055	1.5100	1.4459	1.4469	1.4499
1 5/8	..	..	5 1/2	1.6250	1.6344	1.6399	1.5069	1.5084	1.5124
1 3/4	5	..	..	1.7500	1.7602	1.7657	1.6201	1.6216	1.6256
1 7/8	..	..	5	1.8750	1.8852	1.8907	1.7451	1.7466	1.7506
2	4 1/2	..	..	2.0000	2.0111	2.0166	1.8557	1.8572	1.8612
2 1/8	..	..	4 1/2	2.1250	2.1361	2.1421	1.9807	1.9822	1.9867
2 1/4	4 1/2	..	..	2.2500	2.2611	2.2671	2.1057	2.1072	2.1117
2 3/8	..	..	4	2.3750	2.3878	2.3938	2.2126	2.2146	2.2191
2 1/2		..	..	2.5000	2.5128	2.5188	2.3376	2.3396	2.3441
2 5/8	..	..	4	2.6250	2.6378	2.6448	2.4626	2.4646	2.4696
2 3/4	4	..	..	2.7500	2.7628	2.7698	2.5876	2.5896	2.5946
2 7/8	..	..	3 1/2	2.8750	2.8894	2.8964	2.6894	2.6914	2.6964
3	4	..	..	3.0000	3.0133	3.0203	2.8376	2.8401	2.8456
3 1/4	4	..	..	3.2500	3.2633	3.2703	3.0876	3.0901	3.0956
3 1/2	4	..	..	3.5000	3.5133	3.5203	3.3376	3.3401	3.3456
3 3/4	4	..	..	3.7500	3.7633	3.7703	3.5876	3.5901	3.5956
4	4	..	..	4.0000	4.0133	4.0203	3.8376	3.8401	3.8456

(Concluded on following page)

TABLE 325

Fractional Size Taps

Cut Thread—American National Form
(Concluded)

Lead Tolerance

A maximum lead error of plus or minus .003″ in one inch of thread is permitted.

Angle Tolerance

Threads per Inch	Error in Half Angle	Error in Full Angle
4 and coarser.	30′ Plus or Minus	45′
4½ to 5½ incl.	35′ Plus or Minus	53′
6 to 9 incl.	40′ Plus or Minus	60′
10 to 28 incl.	45′ Plus or Minus	68′
30 to 64 incl.	60′ Plus or Minus	90′

Formulae

Minimum Major Diameter = Basic plus (B+C)

Maximum Major Diameter = Minimum plus A

Minimum Pitch Diameter = Basic plus B

Maximum Pitch Diameter = Minimum plus D

In the above formulae:—

A = Major diameter tolerance

B = Amount minimum pitch diameter is over basic

C = A constant to add:

20% of the theoretical truncation for 2 to 5½ threads per inch

25% for 6 to 64 threads per inch

D = Pitch diameter tolerance

For values of A, B, C and D see Table 330.

Notes

Pitches coarser than N. F. take N. C. tolerances. Pitches finer than N. F. take tolerances as shown in Table 330.

For Staybolt Taps see Table 333.

TABLE 326

Fractional Size Taps

Commercial Ground Thread—American National Form

Thread Limits

Size	Threads per Inch			Major Diameter			Pitch Diameter		
	N.C.	N.F.	N.S.	Basic	Minimum	Maximum	Basic	Minimum	Maximum
1/4	20	..	..	.2500	.2540	.2550	.2175	.2180	.2190
1/4	..	28	..	.2500	.2525	.2535	.2268	.2273	.2283
5/16	18	..	..	.3125	.3170	.3180	.2764	.2769	.2779
5/16	..	24	..	.3125	.3155	.3165	.2854	.2859	.2869
3/8	16	..	..	.3750	.3800	.3810	.3344	.3349	.3359
3/8	..	24	..	.3750	.3780	.3790	.3479	.3484	.3494
7/16	14	..	..	.4375	.4435	.4445	.3911	.3916	.3926
7/16	..	20	..	.4375	.4415	.4425	.4050	.4055	.4065
1/2	13	..	..	.5000	.5065	.5075	.4500	.4505	.4515
1/2	..	20	..	.5000	.5040	.5050	.4675	.4680	.4690
9/16	12	..	..	.5625	.5690	.5700	.5084	.5089	.5099
9/16	..	18	..	.5625	.5670	.5680	.5264	.5269	.5279
5/8	11	..	..	.6250	.6320	.6330	.5660	.5665	.5676
5/8	..	18	..	.6250	.6295	.6305	.5889	.5894	.5904
11/16	..	..	11	.6875	.6945	.6955	.6285	.6290	.6301
11/16	..	..	16	.6875	.6925	.6935	.6469	.6474	.6484
3/4	10	..	..	.7500	.7575	.7590	.6850	.6855	.6866
3/4	..	16	..	.7500	.7550	.7560	.7094	.7099	.7109
7/8	9	..	..	.8750	.8835	.8850	.8028	.8038	.8050
7/8	..	14	..	.8750	.8810	.8820	.8286	.8296	.8306
7/8	..	..	18	.8750	.8795	.8805	.8389	.8399	.8409
1	8	..	..	1.0000	1.0095	1.0110	.9188	.9198	.9212
1	..	14	..	1.0000	1.0060	1.0070	.9536	.9546	.9556
1 1/8	7	..	..	1.1250	1.1350	1.1370	1.0322	1.0332	1.0347
1 1/8	..	12	..	1.1250	1.1315	1.1325	1.0709	1.0719	1.0729
1 1/4	7	..	..	1.2500	1.2600	1.2620	1.1572	1.1582	1.1597
1 1/4	..	12	..	1.2500	1.2565	1.2575	1.1959	1.1969	1.1979
1 3/8	6	..	..	1.3750	1.3870	1.3890	1.2667	1.2677	1.2695
1 3/8	..	12	..	1.3750	1.3815	1.3825	1.3209	1.3219	1.3229
1 1/2	6	..	..	1.5000	1.5120	1.5140	1.3917	1.3927	1.3945
1 1/2	..	12	..	1.5000	1.5065	1.5075	1.4459	1.4469	1.4479
1 5/8	..	..	5 1/2	1.6250	1.6385	1.6410	1.5069	1.5084	1.5104
1 3/4	5	..	..	1.7500	1.7635	1.7660	1.6201	1.6216	1.6236
1 7/8	..	..	5	1.8750	1.8885	1.8910	1.7451	1.7466	1.7486
2	4 1/2	..	..	2.0000	2.0145	2.0170	1.8557	1.8572	1.8592
2 1/4	4 1/2	..	..	2.2500	2.2645	2.2670	2.1057	2.1072	2.1092
2 1/2	4	..	..	2.5000	2.5165	2.5190	2.3376	2.3396	2.3416
2 3/4	4	..	..	2.7500	2.7665	2.7690	2.5876	2.5896	2.5916

(Concluded on following page)

TABLE 326

Fractional Size Taps

Commercial Ground Thread—American National Form

(Concluded)

Lead Tolerance

A maximum lead error of plus or minus .0005″ in one inch of thread is permitted.

Angle Tolerance

Threads per Inch	Error in Half Angle
4 to 5½ incl.	20′ Plus or Minus
6 to 9 incl.	25′ Plus or Minus
10 to 28 incl.	30′ Plus or Minus

Formulae

Maximum Major Diameter = Basic plus C
Minimum Major Diameter = Maximum minus A

Maximum Pitch Diameter = Minimum plus D
Minimum Pitch Diameter = Basic plus B

In the above formulae:—

A = Major diameter tolerance
B = Amount over basic for minimum pitch diameter
C = A constant to add:
35% of the theoretical truncation for 4 to 5 threads per inch
40% for 5½ to 12 threads per inch
45% for 13 to 48 threads per inch
To nearest .0005″ for 8 or more threads per inch and to nearest .001″ for less than 8 threads per inch
D = Pitch diameter tolerance

For values of A, B, C and D see Table 331.

Notes

All fractional size ground thread taps are regularly made to the above limits and tolerances unless otherwise specified.

For Precision ground thread pitch diameter limits for hand taps see Table 327.

TABLE 327

Fractional Size Taps

Precision Ground Thread—American National Form

Thread Limits

Size	Threads per Inch		Major Diameter		Basic Pitch Diam.	Pitch Diameter Limits					
						01 Limit		1 Limit		2 Limit	
	N.C.	N.F.	Minimum	Maximum		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1/4	20	..	.2540	.2550	.2175	.2170	.2175	.2175	.2180	.2180	.2185
1/4	..	28	.2525	.2535	.2268	....	....	.2268	.2273	.2273	.2278
5/16	18	..	.3170	.3180	.2764	.2759	.2764	.2764	.2769	.2769	.2774
5/16	..	24	.3155	.3165	.2854	....	....	.2854	.2859	.2859	.2864
3/8	16	..	.3800	.3810	.3344	.3339	.3344	.3344	.3349	.3349	.3354
3/8	..	24	.3780	.3790	.3479	....	....	.3479	.3484	.3484	.3489
7/16	14	..	.4435	.4445	.3911	.3906	.3911	.3911	.3916	.3916	.3921
7/16	..	20	.4415	.4425	.4050	....	....	.4050	.4055	.4055	.4060
1/2	13	..	.5065	.5075	.4500	.4495	.4500	.4500	.4505	.4505	.4510
1/2	..	20	.5040	.5050	.4675	....	....	.4675	.4680	.4680	.4685
9/16	12	..	.5690	.5700	.5084	....	....	.5084	.5089	.5089	.5094
9/16	..	18	.5670	.5680	.5264	....	....	.5264	.5269	.5269	.5274
5/8	11	..	.6320	.6330	.5660	....	....	.5660	.5665	.5665	.5670
5/8	..	18	.6295	.6305	.5889	....	....	.5889	.5894	.5894	.5899
3/4	10	..	.7575	.7590	.6850	....	....	.6850	.6855	.6855	.6860
3/4	..	16	.7550	.7560	.7094	....	....	.7094	.7099	.7099	.7104
7/8	9	..	.8835	.8850	.8028	....	....	.8028	.8033	.8033	.8038
7/8	..	14	.8810	.8820	.8286	....	....	.8286	.8291	.8291	.8296
1	8	..	1.0095	1.0110	.9188	....	....	.9188	.9193	.9193	.9198
1	..	14	1.0060	1.0070	.9536	....	....	.9536	.9541	.9541	.9546

Lead Tolerance

A maximum lead error of plus or minus .0005″ in one inch of thread is permitted.

Angle Tolerance

Threads per Inch	Error in Half Angle
8 to 9 Incl.	25′ plus or minus
10 to 28 Incl.	30′ plus or minus

Formulae

Major Diameter is the same as for commercial ground taps.
Pitch Diameter 01 Limit = Basic to basic minus .0005″
Pitch Diameter 1 Limit = Basic to basic plus .0005″
Pitch Diameter 2 Limit = Basic plus .0005″ to basic plus .0010″

Notes

Precision ground thread hand taps not listed in table above are special.

For commercial ground thread limits see Table 326.

TABLE 328

Machine Screw Taps

Cut Thread—American National Form

Thread Limits

Screw Gage No.	Threads per Inch			Major Diameter			Pitch Diameter		
	N.C.	N.F.	N.S.	Basic	Minimum	Maximum	Basic	Minimum	Maximum
0	..	80	..	.0600	.0609	.0624	.0519	.0521	.0531
1	..	..	56	.0730	.0742	.0757	.0614	.0616	.0626
1	64	..	..	.0730	.0740	.0755	.0629	.0631	.0641
1	..	72	..	.0730	.0740	.0755	.0640	.0642	.0652
2	56	..	..	.0860	.0872	.0887	.0744	.0746	.0756
2	..	64	..	.0860	.0870	.0885	.0759	.0761	.0771
3	48	..	..	.0990	.1003	.1018	.0855	.0857	.0867
3	..	56	..	.0990	.1002	.1017	.0874	.0876	.0886
4	..	..	32	.1120	.1142	.1162	.0917	.0922	.0937
4	..	..	36	.1120	.1137	.1157	.0940	.0942	.0957
4	40	..	..	.1120	.1136	.1156	.0958	.0960	.0975
4	..	48	..	.1120	.1133	.1153	.0985	.0987	.1002
5	..	..	36	.1250	.1267	.1287	.1070	.1072	.1087
5	40	..	..	.1250	.1266	.1286	.1088	.1090	.1105
5	..	44	..	.1250	.1264	.1284	.1102	.1104	.1119
6	32	..	..	.1380	.1402	.1422	.1177	.1182	.1197
6	..	..	36	.1380	.1397	.1417	.1200	.1202	.1217
6	..	40	..	.1380	.1396	.1416	.1218	.1220	.1235
7	..	..	30	.1510	.1533	.1553	.1294	.1299	.1314
7	..	..	32	.1510	.1532	.1552	.1307	.1312	.1327
7	..	..	36	.1510	.1527	.1547	.1330	.1332	.1347
8	..	..	30	.1640	.1663	.1683	.1423	.1428	.1443
8	32	..	..	.1640	.1662	.1682	.1437	.1442	.1457
8	..	36	..	.1640	.1657	.1677	.1460	.1462	.1477
8	..	..	40	.1640	.1656	.1676	.1478	.1480	.1495
9	..	..	24	.1770	.1798	.1818	.1499	.1504	.1519
9	..	..	30	.1770	.1793	.1813	.1553	.1558	.1573
9	..	..	32	.1770	.1792	.1812	.1567	.1572	.1587
10	24	..	..	.1900	.1928	.1948	.1629	.1634	.1649
10	..	..	28	.1900	.1924	.1944	.1668	.1673	.1688
10	..	..	30	.1900	.1923	.1943	.1684	.1689	.1704
10	..	32	..	.1900	.1922	.1942	.1697	.1702	.1717
12	24	..	..	.2160	.2188	.2208	.1889	.1894	.1909
12	..	28	..	.2160	.2184	.2204	.1928	.1933	.1948
12	..	..	32	.2160	.2182	.2202	.1957	.1962	.1977
14	..	..	20	.2420	.2452	.2477	.2095	.2100	.2120

(Concluded on following page)

TABLE 328

Machine Screw Taps

Cut Thread—American National Form
(Concluded)

Thread Limits

Screw Gage No.	Threads per Inch			Major Diameter			Pitch Diameter		
	N.C.	N.F.	N.S.	Basic	Minimum	Maximum	Basic	Minimum	Maximum
14	..	..	24	.2420	.2448	.2473	.2149	.2154	.2174
16	..	..	18	.2680	.2715	.2740	.2319	.2324	.2344
16	..	..	20	.2680	.2712	.2737	.2355	.2360	.2380
16	..	..	22	.2680	.2710	.2735	.2385	.2390	.2410
18	..	..	18	.2940	.2975	.3000	.2579	.2584	.2604
18	..	..	20	.2940	.2972	.2997	.2615	.2620	.2640
20	..	..	16	.3200	.3239	.3264	.2794	.2799	.2819
20	..	..	18	.3200	.3235	.3260	.2839	.2844	.2864
20	..	..	20	.3200	.3232	.3257	.2875	.2880	.2900

Lead Tolerance

A maximum lead error of plus or minus .003″ in one inch of thread is permitted.

Angle Tolerance

Threads per Inch	Error in Half Angle	Error in Full Angle
16 to 28 inclusive	45′ Plus or Minus	68′
30 and finer	60′ Plus or Minus	90′

Formulae

Minimum Major Diameter = Basic plus (B+C)
Maximum Major Diameter = Minimum plus A

Minimum Pitch Diameter = Basic plus B
Maximum Pitch Diameter = Minimum plus D

In the above formulae:—

A = Major diameter tolerance
B = Amount minimum pitch diameter is over basic
C = A constant to add:
25% of the theoretical truncation for 16 to 80 threads per inch
D = Pitch diameter tolerance

For values of A, B, C and D see Table 330.

TABLE 329

Machine Screw Taps

Commercial Ground Thread—American National Form

Thread Limits

Screw Gage No.	Threads per Inch			Major Diameter			Pitch Diameter		
	N.C.	N.F.	N.S.	Basic	Minimum	Maximum	Basic	Minimum	Maximum
3	48	..	..	.0990	.1000	.1010	.0855	.0857	.0867
3	..	56	..	.0990	.0995	.1005	.0874	.0876	.0886
4	..	..	36	.1120	.1135	.1145	.0940	.0942	.0952
4	40	..	..	.1120	.1135	.1145	.0958	.0960	.0970
4	..	48	..	.1120	.1130	.1140	.0985	.0987	.0997
5	40	..	..	.1250	.1265	.1275	.1088	.1090	.1100
5	..	44	..	.1250	.1260	.1270	.1102	.1104	.1114
6	32	..	..	.1380	.1400	.1410	.1177	.1182	.1192
6	..	40	..	.1380	.1395	.1405	.1218	.1220	.1230
8	32	..	..	.1640	.1660	.1670	.1437	.1442	.1452
8	..	36	..	.1640	.1655	.1665	.1460	.1462	.1472
10	24	..	..	.1900	.1930	.1940	.1629	.1634	.1644
10	..	32	..	.1900	.1920	.1930	.1697	.1702	.1712
12	24	..	..	.2160	.2190	.2200	.1889	.1894	.1904
12	..	28	..	.2160	.2185	.2195	.1928	.1933	.1943
14	..	..	20	.2420	.2460	.2470	.2095	.2100	.2110
14	..	..	24	.2420	.2450	.2460	.2149	.2154	.2164

Lead Tolerance

A maximum lead error of plus or minus .0005″ in one inch of thread is permitted.

Angle Tolerance

20 to 56 threads per inch incl. = 30′ plus or minus in ½ angle.

Formulae

Maximum Major Diameter = Basic plus C
Minimum Major Diameter = Maximum minus A
Maximum Pitch Diameter = Minimum plus D
Minimum Pitch Diameter = Basic plus B

In the above formulae:—
A = Major diameter tolerance
B = Amount over basic for minimum pitch diameter
C = A constant to add:
45% of the theoretical truncation to nearest .0005″
D = Pitch diameter tolerance
For values of A, B, C and D see Table 331.

Note

All ground thread machine screw taps are regularly made to the above limits and tolerances unless otherwise specified.

TABLE 330

Special Taps

Cut Thread—American National Form

General

The following tables and formulae are used in determining the limits and tolerances for cut thread taps having special diameter or special pitch or both.

Lead Tolerance

A maximum lead error of plus or minus .003″ in one inch of thread is permitted.

Angle Tolerance

Threads per Inch	Error in Half Angle	Error in Full Angle
4 and coarser	30′ Plus or Minus	45′
4½ to 5½ incl.	35′ Plus or Minus	53′
6 to 9 incl.	40′ Plus or Minus	60′
10 to 28 incl.	45′ Plus or Minus	68′
30 and finer	60′ Plus or Minus	90′

Formulae

Min. Major Dia. = Basic plus (B+C)
Max. Major Dia. = Min. plus A
Min. Pitch Dia. = Basic plus B
Max. Pitch Dia. = Min. plus D

A = Major diameter tolerance
B = Amount minimum pitch diameter is over basic
C = A constant to add:
20% of the theoretical truncation for 2 to 5½ threads per inch
25% for 6 to 80 threads per inch
D = Pitch diameter tolerance

Values for A, B and D

Diameter of Tap Inches	A	B		D	
		36 or More Threads per Inch	34 or Less Threads per Inch	Coarser than N.F.	*N.F. and Finer
0 to .099 incl.	.0015	.0002	.0005	.0010	.0010
.100 to .249 incl.	.0020	.0002	.0005	.0015	.0015
¼ to ⅜ incl.	.0025	.0005	.0005	.0020	.0015
Over ⅜ to ⅝ incl.	.0030	.0005	.0005	.0025	.0020
Over ⅝ to ¾ incl.	.0040	.0005	.0005	.0030	.0025
Over ¾ to 1 incl.	.0040	.0010	.0010	.0030	.0025
Over 1 to 1½ incl.	.0045	.0010	.0010	.0035	.0030
Over 1½ to 2 incl.	.0055	.0015	.0015	.0040	.0030
Over 2 to 2¼ incl.	.0060	.0015	.0015	.0045	.0035
Over 2¼ to 2½ incl.	.0060	.0020	.0020	.0045	.0035
Over 2½ to 3 incl.	.0070	.0020	.0020	.0050	.0035
Over 3	.0070	.0025	.0025	.0055	.0045

Values for C

Threads per Inch	Constant	Threads per Inch	Constant	Threads per Inch	Constant	Threads per Inch	Constant
2	.0217	7	.0077	18	.0030	36	.0015
2½	.0173	8	.0068	20	.0027	40	.0014
3	.0144	9	.0060	22	.0025	48	.0011
3½	.0124	10	.0054	24	.0023	50	.0011
4	.0108	11	.0049	26	.0021	56	.0010
4½	.0096	12	.0045	27	.0020	60	.0009
5	.0087	13	.0042	28	.0019	64	.0008
5½	.0079	14	.0039	30	.0018	72	.0008
6	.0090	16	.0034	32	.0017	80	.0007

For intermediate pitches use constant for next coarser pitch.

Note

*Taps over 1½″ with 10 or more threads per inch have tolerances for N.F. and finer.

TABLE 331

Special Taps

Commercial Ground Thread—American National Form

General

The following tables and formulae are used in determining the limits and tolerances for ground thread taps having special diameter or special pitch or both.

Lead Tolerance

A maximum lead error of plus or minus .0005″ in one inch of thread is permitted.

Angle Tolerance

Threads per Inch	Error in Half Angle
4 to 5½ incl.	20′ Plus or Minus
6 to 9 incl.	25′ Plus or Minus
10 to 56 incl.	30′ Plus or Minus

Formulae

Max. Major Dia. = Basic plus C
Min. Major Dia. = Max. minus A
Max. Pitch Dia. = Min. plus D
Min. Pitch Dia. = Basic plus B

In the above formulae:—

A = Major diameter tolerance

B = Amount over basic for minimum pitch diameter

C = A constant to add:

35% of the theoretical truncation for 4 to 5 threads per inch
40% for 5½ to 12 threads per inch
45% for 13 to 56 threads per inch

To nearest .0005″ for 8 or more threads per inch and to nearest .001″ for less than 8 threads per inch

D = Pitch diameter tolerance

Values for A, B, C and D

Threads per Inch	A	B				C	D
		To ¾″ incl.	Over ¾″ to 1½″ incl.	Over 1½″ to 2¼″ incl.	Over 2¼″		
56	.0010	.0002	.0010	.0015	.0020	.0015	.0010
48	.0010	.0002	.0010	.0015	.0020	.0020	.0010
44	.0010	.0002	.0010	.0015	.0020	.0020	.0010
40	.0010	.0002	.0010	.0015	.0020	.0025	.0010
36	.0010	.0002	.0010	.0015	.0020	.0025	.0010
32	.0010	.0005	.0010	.0015	.0020	.0030	.0010
28	.0010	.0005	.0010	.0015	.0020	.0035	.0010
24	.0010	.0005	.0010	.0015	.0020	.0040	.0010
20	.0010	.0005	.0010	.0015	.0020	.0050	.0010
18	.0010	.0005	.0010	.0015	.0020	.0055	.0010
16	.0010	.0005	.0010	.0015	.0020	.0060	.0010
14	.0010	.0005	.0010	.0015	.0020	.0070	.0010
13	.0010	.0005	.0010	.0015	.0020	.0075	.0010
12	.0010	.0005	.0010	.0015	.0020	.0075	.0010
11	.0010	.0005	.0010	.0015	.0020	.0080	.0011
10	.0015	.0005	.0010	.0015	.0020	.0090	.0011
9	.0015	....	.0010	.0015	.0020	.0100	.0012
8	.0015	....	.0010	.0015	.0020	.0110	.0014
7	.0020	....	.0010	.0015	.0020	.0120	.0015
6	.0020	....	.0010	.0015	.0020	.0140	.0018
5½	.0025	....	....	.0015	.0020	.0160	.0020
5	.0025	....	....	.0015	.0020	.0160	.0020
4½	.0025	....	....	.0015	.0020	.0170	.0020
4	.0025	....	....	.0015	.0020	.0190	.0020

For intermediate pitches use value for next coarser pitch.

TABLE 332
Stove Bolt Taps
Cut Thread—Manufacturers Standard
Thread Limits

Size	Threads per Inch S.B.	Major Diameter			Pitch Diameter		
		Basic	Minimum	Maximum	Basic	Minimum	Maximum
1/8	32	.1250	.1280	.1310	.1080	.1110	.1130
5/32	28	.1630	.1660	.1690	.1440	.1470	.1490
3/16	24	.1950	.1980	.2010	.1730	.1760	.1780
7/32	22	.2220	.2255	.2285	.1980	.2015	.2035
1/4	18	.2500	.2525	.2555	.2240	.2275	.2295
5/16	18	.3125	.3150	.3180	.2764	.2779	.2804
3/8	16	.3750	.3780	.3810	.3344	.3359	.3384
7/16	14	.4375	.4400	.4440	.3911	.3926	.3956
1/2	13	.5000	.5030	.5070	.4500	.4515	.4545

Lead Tolerance

A maximum lead error of plus or minus .003″ in one inch of thread is permitted.

TABLE 333
Straight Boiler and Staybolt Taps
Cut Thread—American National Form
Thread Limits

Size	Threads per Inch National Form	Major Diameter			Pitch Diameter		
		Basic	Minimum	Maximum	Basic	Minimum	Maximum
1/2	12	.5000	.5010	.5040	.4459	.4464	.4489
9/16	12	.5625	.5635	.5665	.5084	.5089	.5114
5/8	12	.6250	.6260	.6290	.5709	.5714	.5739
11/16	12	.6875	.6885	.6925	.6334	.6339	.6369
3/4	12	.7500	.7510	.7550	.6959	.6964	.6994
13/16	12	.8125	.8135	.8175	.7584	.7589	.7619
7/8	12	.8750	.8760	.8800	.8209	.8214	.8244
15/16	12	.9375	.9385	.9425	.8834	.8839	.8869
1	12	1.0000	1.0010	1.0050	.9459	.9464	.9494
1 1/16	12	1.0625	1.0635	1.0675	1.0084	1.0089	1.0119
1 1/8	12	1.1250	1.1265	1.1310	1.0709	1.0714	1.0749
1 3/16	12	1.1875	1.1890	1.1935	1.1334	1.1339	1.1374
1 1/4	12	1.2500	1.2515	1.2560	1.1959	1.1964	1.1999
1 5/16	12	1.3125	1.3140	1.3185	1.2584	1.2589	1.2624
1 3/8	12	1.3750	1.3765	1.3810	1.3209	1.3214	1.3249
1 7/16	12	1.4375	1.4390	1.4435	1.3834	1.3839	1.3874
1 1/2	12	1.5000	1.5015	1.5060	1.4459	1.4464	1.4499
1 5/8	12	1.6250	1.6265	1.6320	1.5709	1.5719	1.5759
1 3/4	12	1.7500	1.7515	1.7570	1.6959	1.6969	1.7009
1 7/8	12	1.8750	1.8765	1.8820	1.8209	1.8219	1.8259
2	12	2.0000	2.0015	2.0070	1.9459	1.9469	1.9509

Lead Tolerance

A maximum lead error of plus or minus .003″ in one inch of thread is permitted.

TABLE 334

Straight Pipe Taps

Cut Thread — American Standard Pipe Form

Thread Limits

Nominal Size Inches	Threads per Inch N.P.S.	Size at Gaging Notch	Pitch Diameter			
			American Standard Pipe		Grease Cup Fittings	
			Minimum	Maximum	Minimum	Maximum
1/8	27	.3748	.3733	.3763	.3680	.3700
1/4	18	.4899	.4884	.4914	.4810	.4830
3/8	18	.6270	.6253	.6288	.6180	.6200
1/2	14	.7784	.7767	.7802	.7670	.7695
3/4	14	.9889	.9869	.9909	.9775	.9800
1	11 1/2	1.2386	1.2366	1.2406	1.2245	1.2275
1 1/4	11 1/2	1.5834	1.5811	1.5856	....	....
1 1/2	11 1/2	1.8223	1.8201	1.8246	....	....
2	11 1/2	2.2963	2.2938	2.2988	....	....
2 1/2	8	2.7622	2.7594	2.7649	....	....
3	8	3.3885	3.3858	3.3913	....	....
3 1/2	8	3.8888	3.8861	3.8916	....	....
4	8	4.3871	4.3844	4.3899	....	....

Lead Tolerance

A maximum lead error of plus or minus .003" in one inch of thread is permitted.

Angle Tolerance

Threads per Inch	Error in Half Angle	Error in Full Angle
8	40′ Plus or Minus	60′
11 1/2 to 27 inclusive	45′ Plus or Minus	68′

Marking

In addition to the regular marking, Grease Cup Fitting Taps should be marked "Grease."

(Concluded on following page)

TABLE 334

Straight Pipe Taps

Cut Thread — American Standard Pipe Form

(Concluded)

Formulae for American Standard Pipe Form

(Approximate)

Minimum Major Diameter = Measured pitch diameter plus "A"
Maximum Major Diameter = Measured pitch diameter plus "B"

Minimum Minor Diameter = Measured pitch diameter minus "B"
Maximum Minor Diameter = Measured pitch diameter minus "C"

Minimum Pitch Diameter = Size at gaging notch minus one-half tolerance
Maximum Pitch Diameter = Minimum plus tolerance

Formulae for Grease Cup Fitting Taps

(Approximate)

Minimum Major Diameter = Measured pitch diameter plus "D"
Maximum Major Diameter = Measured pitch diameter plus "E"

Minimum Minor Diameter = Measured pitch diameter minus "B"
Maximum Minor Diameter = Measured pitch diameter minus "C"

Minimum Pitch Diameter = Maximum minus tolerance
Maximum Pitch Diameter = Size at gaging notch minus taper in two turns

Formulae Values

Threads per Inch N.P.S.	A	B	C	D	E
27	.0267	.0296	.0257	.0234	.0251
18	.0408	.0444	.0401	.0377	.0395
14	.0535	.0571	.0525	.0515	.0533
11½	.0658	.0696	.0647	.0615	.0649
8	.0966	.1000	.0946	.....	.....

Note

As the American Standard Pipe Thread Form is to be maintained, the major and minor diameters vary with the Pitch Diameter. Either a flat or a rounded form is allowable at both the crest and root.

TABLE 335

Straight Pipe Taps

Ground Thread — American Standard Pipe Form

Thread Limits

Nominal Size Inches	Threads per Inch N.P.S.	Major Diameter			Pitch Diameter		
		Plug at Gaging Notch	Minimum G	Maximum H	Plug at Gaging Notch E	Minimum K	Maximum L
1/8	27	.3994	.4034	.4044	.3748	.3753	.3763
1/4	18	.5269	.5323	.5333	.4899	.4904	.4914
3/8	18	.6640	.6694	.6704	.6270	.6275	.6285
1/2	14	.8260	.8335	.8345	.7784	.7789	.7799
3/4	14	1.0364	1.0440	1.0450	.9889	.9894	.9904
1	11 1/2	1.2966	1.3057	1.3072	1.2386	1.2396	1.2407
1 1/4	11 1/2	1.6413	1.6505	1.6520	1.5834	1.5844	1.5855
1 1/2	11 1/2	1.8803	1.8894	1.8909	1.8223	1.8233	1.8244
2	11 1/2	2.3542	2.3634	2.3649	2.2963	2.2973	2.2984
2 1/2	8	2.8454	2.8597	2.8612	2.7622	2.7632	2.7646
3	8	3.4718	3.4860	3.4875	3.3885	3.3895	3.3909
3 1/2	8	3.9721	3.9863	3.9878	3.8888	3.8898	3.8912
4	8	4.4704	4.4846	4.4861	4.3871	4.3881	4.3895

Ground Thread — For Grease Cup Fittings

Thread Limits

Nominal Size Inches	Threads per Inch (Grease)	Major Diameter		Pitch Diameter		
		Minimum G	Maximum H	Plug at Gaging Notch E	Minimum K	Maximum L
1/8	27	.3929	.3944	.3748	.3690	.3700
1/4	18	.5202	.5217	.4899	.4820	.4830
3/8	18	.6572	.6587	.6270	.6190	.6200
1/2	14	.8202	.8217	.7784	.7680	.7695
3/4	14	1.0307	1.0322	.9889	.9785	.9800
1	11 1/2	1.2889	1.2909	1.2386	1.2260	1.2275

(Concluded on following page)

TABLE 335

Straight Pipe Taps

Ground Thread — American Standard Pipe Form

(Concluded)

Lead Tolerance

A maximum lead error of plus or minus .005″ in one inch of thread is permitted.

Angle Tolerance

Threads per Inch	Error in Half Angle
8	25′ Plus or Minus
11½ to 27 inclusive	30′ Plus or Minus

Marking

In addition to regular marking, Grease Cup Fitting Taps should be marked "Grease."

Formulae for American Standard Pipe Form

Nominal Size Inches	Major Diameter		Minor Diameter		Pitch Diameter	
	Minimum G	Maximum H	Minimum	Maximum	Minimum K	Maximum L
⅛	H − .0010″	(K + A) − .0005″	M − A	M − B	E + .0005″	K + D
¼ to ¾ Incl.	H − .0010″	(K + A) − .0015″	M − A	M − B	E + .0005″	K + D
1 to 4 Incl	H − .0015″	(K + A) − .0020″	M − A	M − B	E + .0010″	K + D

Formulae for Grease Cup Fitting Taps

Nominal Size Inches	Major Diameter		Minor Diameter		Pitch Diameter	
	Minimum G	Maximum H	Minimum	Maximum	Minimum K	Maximum L
⅛ to ⅜ Incl.	H − .0015″	(L + A) − .005″	M − A	M − B	L − .0010″	F
½ to ¾ Incl.	H − .0015″	(L + A) − .005″	M − A	M − B	L − .0015″	F
1	H − .0020″	(L + A) − .005″	M − A	M − B	L − .0015″	F

Note: In above tables + indicates plus: − indicates minus.

Formulae Values

Threads per Inch	A	B	D	E	F	M
27	.0296″	.0257″	.0010″	Pitch diameter of plug at gaging notch	Pitch diameter of plug at 2 threads below gaging notch	Actual measured pitch diameter
18	.0444″	.0401″	.0010″			
14	.0571″	.0525″	.0010″			
11½	.0696″	.0647″	.0011″			
8	.1000″	.0946″	.0014″			

TABLE 336

Bent Shank Tapper Taps

Class 2

Cut Thread—American National Form

Thread Limits

Size	Threads per Inch		Major Diameter			Pitch Diameter		
	N.C.	N.F.	Basic	Minimum	Maximum	Basic	Minimum	Maximum
1/4	20	..	.2500	.2527	.2552	.2175	.2175	.2195
1/4	..	28	.2500	.2519	.2544	.2268	.2263	.2283
5/16	18	..	.3125	.3155	.3180	.2764	.2764	.2784
5/16	..	24	.3125	.3148	.3173	.2854	.2849	.2869
3/8	16	..	.3750	.3784	.3809	.3344	.3344	.3364
3/8	..	24	.3750	.3768	.3793	.3479	.3469	.3489
7/16	14	..	.4375	.4414	.4444	.3911	.3911	.3936
7/16	..	20	.4375	.4392	.4422	.4050	.4035	.4060
1/2	13	..	.5000	.5042	.5072	.4500	.4500	.4525
1/2	..	20	.5000	.5017	.5047	.4675	.4660	.4685
9/16	12	..	.5625	.5670	.5700	.5084	.5084	.5109
9/16	..	18	.5625	.5645	.5675	.5264	.5249	.5274
5/8	11	..	.6250	.6299	.6329	.5660	.5660	.5685
5/8	..	18	.6250	.6270	.6300	.5889	.5874	.5899
3/4	10	..	.7500	.7554	.7594	.6850	.6850	.6880
3/4	..	16	.7500	.7519	.7559	.7094	.7074	.7104

Lead Tolerance

A maximum lead error of plus or minus .003" in one inch of thread is permitted.

Note

Taps made to the above thread limits will be marked "Class 2" in addition to the regular marking.

TABLE 338

Taper Pipe Taps

Cut and Ground Thread

American Standard Pipe Thread

Thread Limits

Nominal Size Inches	Threads per Inch N.P.T.	*Gage Measurement—Inches			Taper per Foot—Inches			
		Projection	Tolerance Plus or Minus		Cut Thread		Ground Thread	
			Cut Thread	Ground Thread	Minimum	Maximum	Minimum	Maximum
1/16	27	.312	1/16	1/16	23/32	27/32	23/32	25/32
1/8	27	.312	1/16	1/16	23/32	27/32	23/32	25/32
1/4	18	.459	1/16	1/16	23/32	27/32	23/32	25/32
3/8	18	.454	1/16	1/16	23/32	27/32	23/32	25/32
1/2	14	.579	1/16	1/16	23/32	13/16	23/32	25/32
3/4	14	.565	1/16	1/16	23/32	13/16	23/32	25/32
1	11 1/2	.678	3/32	3/32	23/32	13/16	23/32	25/32
1 1/4	11 1/2	.686	3/32	3/32	23/32	13/16	23/32	25/32
1 1/2	11 1/2	.699	3/32	3/32	23/32	13/16	23/32	25/32
2	11 1/2	**.667	3/32	3/32	23/32	13/16	23/32	25/32
2 1/2	8	.925	3/32	3/32	47/64	51/64	47/64	25/32
3	8	.925	3/32	3/32	47/64	51/64	47/64	25/32
3 1/2	8	.938	1/8	1/8	47/64	51/64	47/64	25/32
4	8	.950	1/8	1/8	47/64	51/64	47/64	25/32

* Distance small end of tap projects through American Standard Pipe Thread Ring Gage.

** Not suitable for 2" A.P.I. line pipe.

(Concluded on following page)

TABLE 338

Taper Pipe Taps

Cut and Ground Thread
American Standard Pipe Thread
(Concluded)

Lead Tolerance

Cut Thread = Maximum lead error plus or minus .003″ in one inch of thread

Ground Thread = Maximum lead error plus or minus .0005″ in one inch of thread.

Angle Tolerance

Threads per Inch	Tolerance		
	Half Angle		Full Angle
	Cut Thread	Ground Thread	Cut Thread
8	40′ Plus or Minus	25′ Plus or Minus	60′
11½ to 27 inclusive	45′ Plus or Minus	30′ Plus or Minus	68′

Formulae

Minimum Major Diameter = Measured pitch diameter plus "A"
Maximum Major Diameter = Measured pitch diameter plus "B"

Minimum Minor Diameter = Measured pitch diameter minus "B"
Maximum Minor Diameter = Measured pitch diameter minus "C"

Formulae Values

Threads per Inch	A	B	C
27	.0267	.0296	.0257
18	.0408	.0444	.0401
14	.0535	.0571	.0525
11½	.0658	.0696	.0647
8	.0966	.1000	.0946

Note

For essential dimensions of American Standard Pipe Threads, see Table 357.

TABLE 339

Bent Shank Tapper Taps

for Tapping Free Fit

Cut Thread—American National Coarse

Thread Limits

Size	Threads per Inch	Major Diameter			Pitch Diameter		
		Basic	Minimum	Maximum	Basic	Minimum	Maximum
1/4	20	.2500	.2542	.2567	.2175	.2190	.2210
5/16	18	.3125	.3170	.3195	.2764	.2779	.2799
3/8	16	.3750	.3799	.3824	.3344	.3359	.3379
7/16	14	.4375	.4429	.4459	.3911	.3926	.3951
1/2	13	.5000	.5057	.5087	.4500	.4515	.4540
9/16	12	.5625	.5685	.5715	.5084	.5099	.5124
5/8	11	.6250	.6314	.6344	.5660	.5675	.5700
3/4	10	.7500	.7569	.7609	.6850	.6865	.6895

Lead Tolerance

A maximum lead error of plus or minus .003″ in one inch of thread is permitted.

TABLE 340

Taper Pipe Taps

Cut and Ground Thread—British Standard Form

American Tap Manufacturers' Practice

Thread Limits and Tolerances

Nominal Size Inches	Thrds. per Inch B.S.P.	*Gage Measurement Inches			Lead Tolerance per Inch of Thread Plus or Minus Inches		Angle Tolerance			Taper per Foot Plus or Minus Inches	
		Projection	Tolerance Plus or Minus				Half Angle Plus or Minus		Full Angle		
			Cut Thread	Ground Thread	Cut Thread	Ground Thread	Cut Thread	Ground Thread	Cut Thread	Cut Thread	Ground Thread
1/8	28	.286	1/16	1/16	.003	.0005	45′	30′	68′	1/16	1/32
1/4	19	.391	1/16	1/16	.003	.0005	45′	30′	68′	1/16	1/32
3/8	19	.391	1/16	1/16	.003	.0005	45′	30′	68′	1/16	1/32
1/2	14	.509	1/16	1/16	.003	.0005	45′	30′	68′	1/16	1/32
3/4	14	.509	1/16	1/16	.003	.0005	45′	30′	68′	1/16	1/32
1	11	.662	3/32	3/32	.003	.0005	45′	30′	68′	1/16	1/32
1 1/4	11	.662	3/32	3/32	.003	.0005	45′	30′	68′	1/16	1/32
1 1/2	11	.662	3/32	3/32	.003	.0005	45′	30′	68′	1/16	1/32
2	11	.707	3/32	3/32	.003	.0005	45′	30′	68′	1/16	1/32
2 1/2	11	.776	3/32	3/32	.003	.0005	45′	30′	68′	1/16	1/32
3	11	.776	3/32	3/32	.003	.0005	45′	30′	68′	1/16	1/32
3 1/2	11	.807	1/8	1/8	.003	.0005	45′	30′	68′	1/16	1/32
4	11	.852	1/8	1/8	.003	.0005	45′	30′	68′	1/16	1/32

* Distance small end of tap projects through British Standard Pipe Thread Ring Gage.

Formulae

The maximum error in radius at the crest and root of thread shall not exceed .03 pitch or:—

Plus or minus .001″ on 28 threads per inch
.0016″ on 19 threads per inch
.0021″ on 14 threads per inch
.0027″ on 11 threads per inch

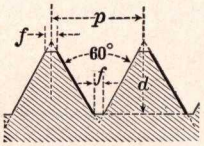
Note

For essential dimensions of British Standard Form Pipe Threads, see Table 358.

TABLE 351

Basic Thread Dimensions and Tap Drill Sizes

Fractional Sizes—American National Form



$$\text{Formula} \begin{cases} p = \text{pitch} = \dfrac{1}{\text{No. thds. per in.}} \\ d = \text{depth} = p \times .64952 \\ f = \text{flat} = \dfrac{p}{8} \end{cases}$$

Nominal Size	Major Diameter Inches	Pitch Diameter Inches	Root Diameter Inches	Commercial Tap Drill to Produce Approx. 75% Full Thread	Decimal Equivalent of Tap Drill
1/16–64	.0625	.0524	.0422	3/64	.0469
72	.0625	.0535	.0445	3/64	.0469
5/64–60	.0781	.0673	.0563	1/16	.0625
72	.0781	.0691	.0601	52	.0635
3/32–48	.0938	.0803	.0667	49	.0730
50	.0938	.0808	.0678	49	.0730
7/64–48	.1094	.0959	.0823	43	.0890
1/8–32	.1250	.1047	.0844	3/32	.0937
40	.1250	.1088	.0925	38	.1015
9/64–40	.1406	.1244	.1081	32	.1160
5/32–32	.1563	.1360	.1157	1/8	.1250
36	.1563	.1382	.1202	30	.1285
11/64–32	.1719	.1516	.1313	9/64	.1406
3/16–24	.1875	.1604	.1334	26	.1470
32	.1875	.1672	.1469	22	.1570
13/64–24	.2031	.1760	.1490	20	.1610
7/32–24	.2188	.1917	.1646	16	.1770
32	.2188	.1985	.1782	12	.1890
15/64–24	.2344	.2073	.1806	10	.1935
1/4–20	.2500	.2175	.1850	7	.2010
24	.2500	.2229	.1959	4	.2090
27	.2500	.2259	.2019	3	.2130
28	.2500	.2268	.2036	3	.2130
32	.2500	.2297	.2094	7/32	.2188

(Continued on following page)

TABLE 351

Basic Thread Dimensions and Tap Drill Sizes

Fractional Sizes—American National Form

(Continued)

Nominal Size	Major Diameter Inches	Pitch Diameter Inches	Root Diameter Inches	Commercial Tap Drill to Produce Approx. 75% Full Thread	Decimal Equivalent of Tap Drill
5/16–18	.3125	.2764	.2403	F	.2570
20	.3125	.2800	.2476	17/64	.2656
24	.3125	.2854	.2584	I	.2720
27	.3125	.2884	.2644	J	.2770
32	.3125	.2922	.2719	9/32	.2812
3/8–16	.3750	.3344	.2938	5/16	.3125
20	.3750	.3425	.3100	21/64	.3281
24	.3750	.3479	.3209	Q	.3320
27	.3750	.3509	.3269	R	.3390
7/16–14	.4375	.3911	.3447	U	.3680
20	.4375	.4050	.3726	25/64	.3906
24	.4375	.4104	.3834	X	.3970
27	.4375	.4134	.3894	Y	.4040
1/2–12	.5000	.4459	.3918	27/64	.4219
13	.5000	.4500	.4001	27/64	.4219
20	.5000	.4675	.4351	29/64	.4531
24	.5000	.4729	.4459	29/64	.4531
27	.5000	.4759	.4519	15/32	.4687
9/16–12	.5625	.5084	.4542	31/64	.4844
18	.5625	.5264	.4903	33/64	.5156
27	.5625	.5384	.5144	17/32	.5312
5/8–11	.6250	.5660	.5069	17/32	.5312
12	.6250	.5709	.5168	35/64	.5469
18	.6250	.5889	.5528	37/64	.5781
27	.6250	.6009	.5769	19/32	.5937
11/16–11	.6875	.6285	.5694	19/32	.5937
16	.6875	.6469	.6063	5/8	.6250
3/4–10	.7500	.6850	.6201	21/32	.6562
12	.7500	.6959	.6418	43/64	.6719
16	.7500	.7094	.6688	11/16	.6875
27	.7500	.7259	.7019	23/32	.7187
13/16–10	.8125	.7476	.6826	23/32	.7187

(Concluded on following page)

TABLE 351

Basic Thread Dimensions and Tap Drill Sizes

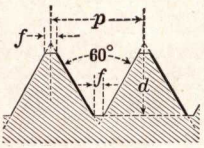
Fractional Sizes—American National Form
(Concluded)

Nominal Size	Major Diameter Inches	Pitch Diameter Inches	Root Diameter Inches	Commercial Tap Drill to Produce Approx. 75% Full Thread	Decimal Equivalent of Tap Drill
7/8 – 9	.8750	.8028	.7307	49/64	.7656
12	.8750	.8209	.7668	51/64	.7969
14	.8750	.8286	.7822	13/16	.8125
18	.8750	.8389	.8028	53/64	.8281
27	.8750	.8509	.8269	27/32	.8437
15/16 – 9	.9375	.8654	.7932	53/64	.8281
1 – 8	1.0000	.9188	.8376	7/8	.8750
12	1.0000	.9459	.8918	59/64	.9219
14	1.0000	.9536	.9072	15/16	.9375
27	1.0000	.9759	.9519	31/32	.9687
1 1/8 – 7	1.1250	1.0322	.9394	63/64	.9844
12	1.1250	1.0709	1.0168	1 3/64	1.0469
1 1/4 – 7	1.2500	1.1572	1.0644	1 7/64	1.1094
12	1.2500	1.1959	1.1418	1 11/64	1.1719
1 3/8 – 6	1.3750	1.2667	1.1585	1 7/32	1.2187
12	1.3750	1.3209	1.2668	1 19/64	1.2969
1 1/2 – 6	1.5000	1.3917	1.2835	1 11/32	1.3437
12	1.5000	1.4459	1.3918	1 27/64	1.4219
1 5/8 – 5 1/2	1.6250	1.5069	1.3888	1 29/64	1.4531
1 3/4 – 5	1.7500	1.6201	1.4902	1 9/16	1.5625
1 7/8 – 5	1.8750	1.7451	1.6152	1 11/16	1.6875
2 – 4 1/2	2.0000	1.8557	1.7113	1 25/32	1.7812
2 1/8 – 4 1/2	2.1250	1.9807	1.8363	1 29/32	1.9062
2 1/4 – 4 1/2	2.2500	2.1057	1.9613	2 1/32	2.0312
2 3/8 – 4	2.3750	2.2126	2.0502	2 1/8	2.1250
2 1/2 – 4	2.5000	2.3376	2.1752	2 1/4	2.2500
2 3/4 – 4	2.7500	2.5876	2.4252	2 1/2	2.5000
3 – 4	3.0000	2.8376	2.6752	2 3/4	2.7500
3 1/4 – 4	3.2500	3.0876	2.9252	3	3.0000
3 1/2 – 4	3.5000	3.3376	3.1752	3 1/4	3.2500
3 3/4 – 4	3.7500	3.5876	3.4252	3 1/2	3.5000
4 – 4	4.0000	3.8376	3.6752	3 3/4	3.7500

TABLE 352

Basic Thread Dimensions and Tap Drill Sizes

Machine Screw Sizes—American National Form



$$\text{Formula} \begin{cases} p = \text{pitch} = \dfrac{1}{\text{No. thds. per in.}} \\ d = \text{depth} = p \times .64952 \\ f = \text{flat} = \dfrac{p}{8} \end{cases}$$

Screw Gage No.	Major Diameter Inches	Pitch Diameter Inches	Root Diameter Inches	Commercial Tap Drill to Produce Approx. 75% Full Thread	Decimal Equivalent of Tap Drill
0–80	.0600	.0519	.0438	3/64	.0469
1–56	.0730	.0614	.0498	54	.0550
64	.0730	.0629	.0527	53	.0595
72	.0730	.0640	.0550	53	.0595
2–56	.0860	.0744	.0628	50	.0700
64	.0860	.0759	.0657	50	.0700
3–48	.0990	.0855	.0719	47	.0785
56	.0990	.0874	.0758	45	.0820
4–32	.1120	.0917	.0714	45	.0820
36	.1120	.0940	.0759	44	.0860
40	.1120	.0958	.0795	43	.0890
48	.1120	.0985	.0849	42	.0935
5–36	.1250	.1070	.0889	40	.0980
40	.1250	.1088	.0925	38	.1015
44	.1250	.1102	.0955	37	.1040
6–32	.1380	.1177	.0974	36	.1065
36	.1380	.1200	.1019	34	.1110
40	.1380	.1218	.1055	33	.1130
7–30	.1510	.1294	.1077	31	.1200
32	.1510	.1307	.1104	31	.1200
36	.1510	.1330	.1149	1/8	.1250

(Concluded on following page)

TABLE 352

Basic Thread Dimensions and Tap Drill Sizes

Machine Screw Sizes—American National Form

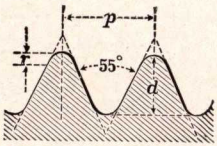
(Concluded)

Screw Gage No.	Major Diameter Inches	Pitch Diameter Inches	Root Diameter Inches	Commercial Tap Drill to Produce Approx. 75% Full Thread	Decimal Equivalent of Tap Drill
8–30	.1640	.1423	.1207	30	.1285
32	.1640	.1437	.1234	29	.1360
36	.1640	.1460	.1279	29	.1360
40	.1640	.1478	.1315	28	.1405
9–24	.1770	.1499	.1229	29	.1360
30	.1770	.1553	.1337	27	.1440
32	.1770	.1567	.1364	26	.1470
10–24	.1900	.1629	.1359	25	.1495
28	.1900	.1668	.1436	23	.1540
30	.1900	.1684	.1467	22	.1570
32	.1900	.1697	.1494	21	.1590
12–24	.2160	.1889	.1619	16	.1770
28	.2160	.1928	.1696	14	.1820
32	.2160	.1957	.1754	13	.1850
14–20	.2420	.2095	.1770	10	.1935
24	.2420	.2149	.1879	7	.2010
16–18	.2680	.2319	.1958	3	.2130
20	.2680	.2355	.2030	7/32	.2187
22	.2680	.2385	.2090	2	.2210
18–18	.2940	.2579	.2218	B	.2380
20	.2940	.2615	.2290	D	.2460
20–16	.3200	.2794	.2388	G	.2610
18	.3200	.2839	.2478	17/64	.2656
20	.3200	.2875	.2550	I	.2720
22–16	.3460	.3054	.2648	9/32	.2812
18	.3460	.3099	.2738	L	.2900
24–16	.3720	.3314	.2908	5/16	.3125
18	.3720	.3359	.2998	O	.3160
26–14	.3980	.3516	.3052	21/64	.3281
16	.3980	.3574	.3168	R	.3390
28–14	.4240	.3776	.3312	T	.3580
16	.4240	.3834	.3428	23/64	.3594
30–14	.4500	.4036	.3572	V	.3770
16	.4500	.4094	.3688	25/64	.3906

TABLE 353

Basic Thread Dimensions and Tap Drill Sizes

British Standard—Whitworth Form



Formula

$$p = \text{pitch} = \frac{1}{\text{No. thds. per in.}}$$

$$d = \text{depth} = p \times .64033$$

$$r = \text{radius} = p \times .1373$$

Nominal Size	Major Diameter Inches	Pitch Diameter Inches	Root Diameter Inches	Commercial Tap Drill to Produce Approx. Full Thread	Decimal Equivalent of Drill
1/16–60	.0625	.0518	.0412	57	.0430
3/32–48	.0938	.0804	.0671	50	.0700
1/8–40	.1250	.1090	.0930	40	.0980
5/32–32	.1563	.1362	.1162	31	.1200
3/16–24	.1875	.1608	.1341	28	.1405
7/32–24	.2188	.1921	.1654	17	.1730
1/4–20	.2500	.2180	.1860	9	.1960
26	.2500	.2254	.2001	4	.2090
9/32–26	.2813	.2566	.2321	C	.2420
5/16–18	.3125	.2769	.2414	1/4	.2500
22	.3125	.2834	.2543	G	.2610
3/8–16	.3750	.3350	.2950	5/16	.3125
20	.3750	.3430	.3110	P	.3230
7/16–14	.4375	.3918	.3460	T	.3580
18	.4375	.4019	.3665	3/8	.3750
1/2–12	.5000	.4466	.3933	Z	.4130
16	.5000	.4600	.4200	7/16	.4375
9/16–12	.5625	.5091	.4558	15/32	.4687
16	.5625	.5225	.4825	1/2	.5000
5/8–11	.6250	.5668	.5086	17/32	.5312
14	.6250	.5793	.5336	35/64	.5469
11/16–11	.6875	.6293	.5711	19/32	.5937
14	.6875	.6418	.5961	39/64	.6094

(Concluded on following page)

TABLE 353

Basic Thread Dimensions and Tap Drill Sizes

British Standard—Whitworth Form

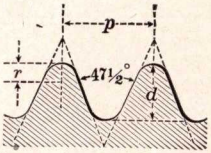
(Concluded)

Nominal Size	Major Diameter Inches	Pitch Diameter Inches	Root Diameter Inches	Commercial Tap Drill to Produce Approx. Full Thread	Decimal Equivalent of Drill
3/4–10	.7500	.6860	.6219	41/64	.6406
12	.7500	.6966	.6434	21/32	.6562
13/16–10	.8125	.7485	.6844	45/64	.7031
12	.8125	.7591	.7059	23/32	.7187
7/8– 9	.8750	.8039	.7327	3/4	.7500
11	.8750	.8168	.7586	25/32	.7812
15/16– 9	.9375	.8664	.7952	13/16	.8125
1 – 8	1.0000	.9200	.8399	55/64	.8593
10	1.0000	.9360	.8720	57/64	.8906
1 1/8– 7	1.1250	1.0335	.9420	31/32	.9687
9	1.1250	1.0539	.9828	1	1.0000
1 1/4– 7	1.2500	1.1585	1.0670	1 3/32	1.0937
9	1.2500	1.1789	1.1078	1 1/8	1.1250
1 3/8– 6	1.3750	1.2683	1.1616	1 3/16	1.1875
8	1.3750	1.2950	1.2150	1 15/64	1.2343
1 1/2– 6	1.5000	1.3933	1.2866	1 5/16	1.3125
8	1.5000	1.4200	1.3400	1 3/8	1.3750
1 5/8– 5	1.6250	1.4969	1.3689	1 13/32	1.4062
1 3/4– 5	1.7500	1.6219	1.4939	1 17/32	1.5312
1 7/8– 4 1/2	1.8750	1.7327	1.5904	1 5/8	1.6250
2 – 4 1/2	2.0000	1.8577	1.7154	1 3/4	1.7500
2 1/8– 4 1/2	2.1250	1.9827	1.8404	1 7/8	1.8750
2 1/4– 4	2.2500	2.0899	1.9298	1 31/32	1.9687
2 3/8– 4	2.3750	2.2149	2.0548	2 3/32	2.0937
2 1/2– 4	2.5000	2.3399	2.1798	2 7/32	2.2187
2 3/4– 3 1/2	2.7500	2.5671	2.3841	2 7/16	2.4375
3 – 3 1/2	3.0000	2.8171	2.6341	2 11/16	2.6875
3 1/4– 3 1/4	3.2500	3.0530	2.8560	2 7/8	2.8750
3 1/2– 3 1/4	3.5000	3.3030	3.1060	3 1/8	3.1250
3 3/4– 3	3.7500	3.5366	3.3231	3 3/8	3.3750
4 – 3	4.0000	3.7866	3.5731	3 5/8	3.6250

TABLE 354

Basic Thread Dimensions and Tap Drill Sizes

British Association Standard



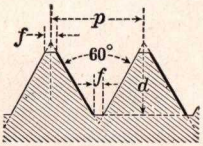
Formula
p = pitch
d = depth $= p \times .6$
r = radius $= \frac{2 \times p}{11}$

Number	Pitch m/m	Major Diameter m/m	Pitch Diameter m/m	Root Diameter m/m	Commercial Tap Drill to Produce Approximately Full Thread
0	1.00	6.0	5.400	4.80	10
1	.90	5.3	4.760	4.22	17
2	.81	4.7	4.215	3.73	24
3	.73	4.1	3.660	3.22	29
4	.66	3.6	3.205	2.81	32
5	.59	3.2	2.845	2.49	37
6	.53	2.8	2.480	2.16	43
7	.48	2.5	2.210	1.92	46
8	.43	2.2	1.940	1.68	50
9	.39	1.9	1.665	1.43	53
10	.35	1.7	1.490	1.28	55
11	.31	1.5	1.315	1.13	56
12	.28	1.3	1.130	.96	60
14	.23	1.0	.860	.72	70

TABLE 355

Basic Thread Dimensions and Tap Drill Sizes

French and International Standard



Formula $\begin{cases} p = \text{pitch} \\ d = \text{depth} = p \times .64952 \\ f = \text{flat} = \frac{p}{8} \end{cases}$

Nominal Diameter m/m	Pitch m/m			Pitch Diameter m/m	Root Diameter m/m	Commercial Tap Drill to Produce Approx. 75% Full Thread
	French Std.	International Std. (D. I. N.)	Optional			
1.5	.35	...	...	1.273	1.05	1.1
2	...	.40	...	1.740	1.48	1.6
2	.45	...	...	1.708	1.42	1.5
2	...	...	.50	1.675	1.35	1.5
2.3	...	.40	...	2.040	1.78	1.9
2.5	.45	...	...	2.208	1.92	2.0
2.6	...	.45	...	2.308	2.02	2.1
3	...	.50	...	2.675	2.35	2.5
3	.60	...	...	2.610	2.22	2.4
3	...	...	.75	2.513	2.03	2.25
3.5	.60	.60	...	3.110	2.72	2.9
4	...	.70	...	3.545	3.09	3.3
4	.75	...	...	3.513	3.03	3.25
4.5	.75	.75	...	4.013	3.53	3.75
5	...	...	.75	4.513	4.03	4.25
5	...	.80	...	4.480	3.96	4.2
5	.90	...	...	4.415	3.83	4.1
5	...	...	1.00	4.350	3.70	4.0
5.5	...	...	.75	5.013	4.53	4.75
5.5	.90	.90	...	4.915	4.33	4.6
6	1.00	1.00	...	5.350	4.70	5.0
6	...	...	1.25	5.188	4.38	4.8
7	1.00	1.00	...	6.350	5.70	6.0
7	...	...	1.25	6.188	5.38	5.8
8	1.00	...	...	7.350	6.70	7.0
8	...	1.25	...	7.188	6.38	6.8
9	1.00	...	...	8.350	7.70	8.0
9	...	1.25	...	8.188	7.38	7.8
10	...	...	1.25	9.188	8.38	8.8
10	1.50	1.50	...	9.026	8.05	8.6
11	...	1.50	...	10.026	9.05	9.6

(Concluded on following page)

TABLE 355

Basic Thread Dimensions and Tap Drill Sizes

French and International Standard

(Concluded)

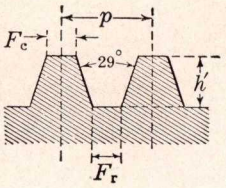
Nominal Diameter m/m	Pitch m/m			Pitch Diameter m/m	Root Diameter m/m	Commercial Tap Drill to Produce Approx. 75% Full Thread
	French Std.	International Std. (D. I. N.)	Optional			
12	...	...	1.25	11.188	10.38	11.0
12	1.50	...	...	11.026	10.05	10.5
12	...	1.75	...	10.863	9.73	10.5
13	...	...	1.50	12.026	11.05	11.5
13	...	...	1.75	11.863	10.73	11.5
13	...	...	2.00	11.701	10.40	11.0
14	...	...	1.25*	13.188	12.38	13.0
14	...	...	1.75	12.863	11.73	12.5
14	2.00	2.00	...	12.701	11.40	12.0
15	...	...	1.75	13.863	12.73	13.5
15	...	...	2.00	13.701	12.40	13.0
16	2.00	2.00	...	14.701	13.40	14.0
17	...	...	2.00	15.701	14.40	15.0
18	...	...	1.50*	17.026	16.05	16.5
18	...	...	2.00	16.701	15.40	16.0
18	2.50	2.50	...	16.376	14.75	15.5
19	...	...	2.50	17.376	15.75	16.5
20	...	...	2.00	18.701	17.40	18.0
20	2.50	2.50	...	18.376	16.75	17.5
22	2.50	2.50	...	20.376	18.75	19.5
24	3.00	3.00	...	22.051	20.10	21.0
26	3.00	...	...	24.051	22.10	23.0
27	...	3.00	...	25.051	23.10	24.0
28	3.00	...	...	26.051	24.10	25.0
30	3.50	3.50	...	27.727	25.45	26.5
32	3.50	...	...	29.727	27.45	28.5
33	...	3.50	...	30.727	28.45	29.5
34	3.50	...	...	31.727	29.45	30.5
36	4.00	4.00	...	33.402	30.80	32.0
38	4.00	...	...	35.402	32.80	34.0
39	...	4.00	...	36.402	33.80	35.0
40	4.00	...	...	37.402	34.80	36.0
42	4.50	4.50	...	39.077	36.15	37.0
44	4.50	...	...	41.077	38.15	39.0
45	...	4.50	...	42.077	39.15	40.0
46	4.50	...	...	43.077	40.15	41.0
48	5.00	5.00	...	44.752	41.50	43.0
50	5.00	...	...	46.752	43.50	45.0

*Spark Plug Sizes.

TABLE 356

Basic Thread Dimensions

American Standard Acme Screw Thread



Symbols:

h = Basic Depth of thread
h' = Depth of thread with clearance
K = { Tap Drill / Basic Minor diameter of nut
F_c = Width of flat at crest of thread
F_r = Width of flat at bottom of space
n = Number of threads per inch
p = Pitch of thread
K_r = Minor diameter of screw
D = Major diameter of screw
T = Major diameter of tap

Formulae

(Approximate)

$p = \frac{1}{n}$

K = D minus p

$F_c = \frac{.3707}{n}$

K_r = D minus 2h'

For 10 or less threads per inch

$h' = \frac{p}{2}$ plus .010

$F_r = \frac{.3707}{n}$ minus .0052

T = D plus .020

For more than 10 threads per inch

$h' = \frac{p}{2}$ plus .005

$F_r = \frac{.3707}{n}$ minus .0026

T = D plus .010

Table of Thread Parts

Pitch (p)	Threads per Inch (n)	Depth of Thread with Clearance (h')	Flat at Top of Thread (F_c)	Flat at Bottom of Space (F_r)	Space at Top of Thread	Thickness at Root of Thread
1	1	.5100	.3707	.3655	.6293	.6345
3/4	1-1/3	.3850	.2780	.2728	.4720	.4772
1/2	2	.2600	.1854	.1802	.3146	.3198
1/3	3	.1767	.1236	.1184	.2097	.2149
1/4	4	.1350	.0927	.0875	.1573	.1625
1/5	5	.1100	.0741	.0689	.1259	.1311
1/6	6	.0933	.0618	.0566	.1049	.1101
1/7	7	.0814	.0530	.0478	.0899	.0951
1/8	8	.0725	.0463	.0411	.0787	.0839
1/9	9	.0655	.0412	.0360	.0699	.0751
1/10	10	.0600	.0371	.0319	.0629	.0681
1/12	12	.0467	.0309	.0283	.0524	.0550
1/14	14	.0407	.0265	.0239	.0449	.0475
1/16	16	.0363	.0232	.0206	.0393	.0419

TABLE 356

Basic Thread Dimensions

American Standard Acme Screw Thread

(Concluded)

General Purpose Series

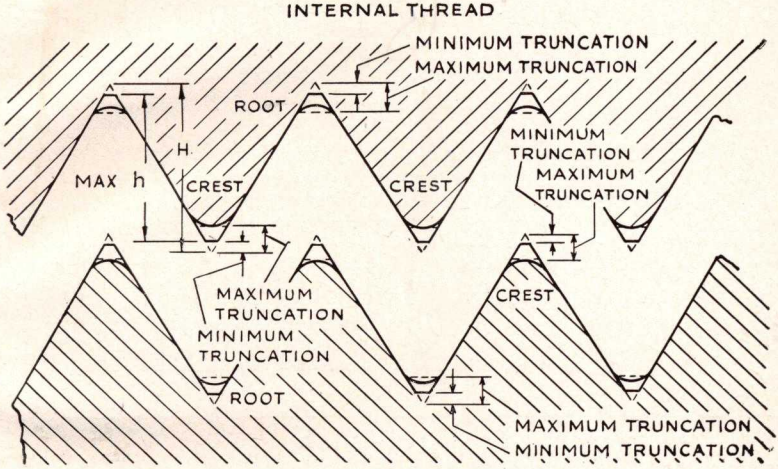
These Acme thread sizes have been adopted both as an A.S.A. standard and a standard for Federal Services. Complete specifications are given in A.S.A. B1. 3-1941 and the National Bureau of Standards Handbook H28. (1944) (Basic dimensions for the 10° square thread, 29° stub thread and 60° stub thread are also included in these pamphlets.)

It is recommended that if a greater lead is required on a given diameter than the thread listed below it is advisable to use a multiple thread of the required lead rather than a single thread of that pitch.

Size Inches	Threads per Inch (N)	Basic Dimensions			Thread Data			
		Major Diameter (D)	Pitch Diameter (E)	Minor Diameter (K)	Thickness at Pitch Line (p/2)	Depth Thread with Clearance (h′)	Basic Width of Flat (F_o)	Helix Angle at Pitch Diam.
1/4	16	.2500	.2187	.1875	.0313	.0363	.0232	5° 12′
5/16	14	.3125	.2768	.2411	.0357	.0407	.0265	4° 42′
3/8	12	.3750	.3333	.2917	.0417	.0467	.0309	4° 33′
7/16	12	.4375	.3958	.3542	.0417	.0467	.0309	3° 50′
1/2	10	.5000	.4500	.4000	.0500	.0600	.0371	4° 3′
5/8	8	.6250	.5625	.5000	.0625	.0725	.0463	4° 3′
3/4	6	.7500	.6667	.5833	.0833	.0933	.0618	4° 33′
7/8	6	.8750	.7917	.7083	.0833	.0933	.0618	3° 50′
1	5	1.0000	.9000	.8000	.1000	.1100	.0741	4° 3′
1 1/8	5	1.1250	1.0250	.9250	.1000	.1100	.0741	3° 33′
1 1/4	5	1.2500	1.1500	1.0500	.1000	.1100	.0741	3° 10′
1 3/8	4	1.3750	1.2500	1.1250	.1250	.1350	.0927	3° 39′
1 1/2	4	1.5000	1.3750	1.2500	.1250	.1350	.0927	3° 19′
1 3/4	4	1.7500	1.6250	1.5000	.1250	.1350	.0927	2° 48′
2	4	2.0000	1.8750	1.7500	.1250	.1350	.0927	2° 26′
2 1/4	3	2.2500	2.0833	1.9167	.1667	.1767	.1236	2° 55′
2 1/2	3	2.5000	2.3333	2.1667	.1667	.1767	.1236	2° 43′
2 3/4	3	2.7500	2.5833	2.4167	.1667	.1767	.1236	2° 21′
3	2	3.0000	2.7500	2.5000	.2500	.2600	.1853	3° 19′
4	2	4.0000	3.7500	3.5000	.2500	.2600	.1853	2° 26′
5	2	5.0000	4.7500	4.5000	.2500	.2600	.1853	1° 55′

TABLE 357

American Standard Pipe Threads



Limits on Crest and Root of American Standard External and Internal Taper Pipe Thread

Threads per Inch	Depth Sharp V Thread Inches H	Depth Pipe Thread "Max." Inches h	Truncation Inches		Equivalent Width of Flat Inches	
			Minimum	Maximum	Minimum	Maximum
27	.03208	.02963	.0012	.0036	.0014	.0041
18	.04811	.04444	.0018	.0049	.0021	.0057
14	.06186	.05714	.0024	.0056	.0027	.0064
11½	.07531	.06957	.0029	.0063	.0033	.0073
8	.10825	.10000	.0041	.0078	.0048	.0090

The limits specified above are intended to serve as a guide for establishing limits of the thread elements of taps, dies and thread chasers. These limits may be required on the product.

The Army-Navy Aeronautical Specifications AN-GG-P-363 agrees with all values given in this table, except those for the maximum truncation and maximum width of flat for the ⅛ inch size, 27 thread. These values are respectively .0027 inch and .0031 inch.

For complete specifications see latest edition of ASA Pamphlet B.2-1.

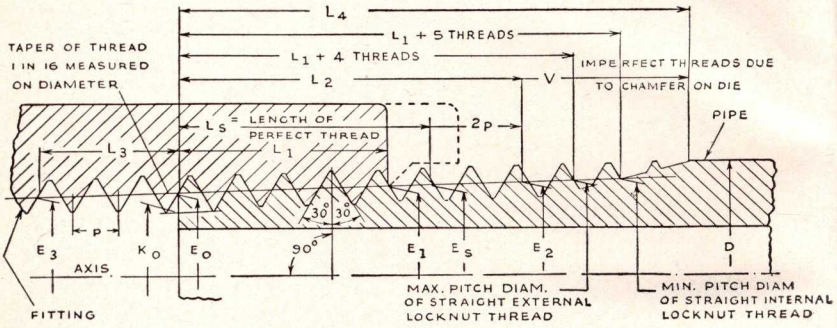
(Continued on following page)

TABLE 357

American Standard Pipe Threads

(Continued)

Dimensional Symbols



n = number of threads per inch

Maximum depth of pipe thread $= \frac{.8}{n}$

Basic major diameter of plug gage = E_1 plus $\frac{.666}{n}$

Basic minor diameter of ring gage = E_1 minus $\frac{.666}{n}$

E_1 is the basic pitch diameter for straight pipe threads

Minimum pitch diameter of straight internal locknut thread = E_1 plus $\frac{.3125}{n}$

Maximum pitch diameter of straight external locknut thread = E_1 plus $\frac{.250}{n}$

(Concluded on following page)

TABLE 357

American Standard Pipe Threads

(Concluded)

Basic Dimensions—Taper Thread

Nominal Pipe Size—Inches	Outside Diameter of Pipe—Inches	Threads per Inch	Pitch of Thread	Pitch Diameter at Gaging Notch Basic—Inches	Thickness of American Std. Thin Ring Gage and Distance from Small Inches to Gaging Notch—Inches	Effective Thread External—Inches	Wrench Take Up—Inches	Total Length of Thread—Inches	Pitch Diameter at Small End of Internal Effective Thread—Inches	Pitch Diameter at End of Pipe—Inches	Minor Diameter at End of Pipe—Inches	*Tap Drill Size
	D	n	p	E_1	L_1	L_2	L_3	L_4	E_3	E_0	K_0	
1/16	.3125	27	.03704	.28118	.160	.2611	.1111	.3896	.26424	.27118	.2416	...
1/8	.405	27	.03704	.37476	.180	.2639	.1111	.3924	.35656	.36351	.3339	R
1/4	.540	18	.05556	.48989	.200	.4018	.1667	.5946	.46697	.47739	.4329	7/16
3/8	.675	18	.05556	.62701	.240	.4078	.1667	.6006	.60160	.61201	.5676	37/64
1/2	.840	14	.07143	.77843	.320	.5337	.2143	.7815	.74504	.75843	.7013	23/32
3/4	1.050	14	.07143	.98887	.339	.5457	.2143	.7935	.95429	.96768	.9105	57/64
1	1.315	11 1/2	.08696	1.23863	.400	.6828	.2609	.9845	1.19733	1.21363	1.1441	1 5/32
1 1/4	1.660	11 1/2	.08696	1.58338	.420	.7068	.2609	1.0085	1.54083	1.55793	1.4876	1 1/2
1 1/2	1.900	11 1/2	.08696	1.82234	.420	.7235	.2609	1.0252	1.77978	1.79609	1.7265	1 47/64
2	2.375	11 1/2	.08696	2.29627	.436	.7565	.2609	1.0582	2.25272	2.26902	2.1995	2 7/32
2**	2.375	11 1/2	.08696	2.29627	.668	.9884	.....	1.2901	.....	.....	.....	...
2 1/2	2.875	8	.12500	2.76216	.682	1.1375	.250	1.5713	2.70391	2.71953	2.6195	2 5/8
3	3.500	8	.12500	3.38850	.766	1.2000	.250	1.6337	3.32500	3.34062	3.2406	3 1/4
3 1/2	4.000	8	.12500	3.88881	.821	1.2500	.250	1.6837	3.82188	3.83750	3.7375	3 3/4
4	4.500	8	.12500	4.38712	.844	1.3000	.250	1.7337	4.31875	4.33438	4.2344	4 1/4
5	5.563	8	.12500	5.44929	.937	1.4063	.250	1.8407	5.37511	5.39073	5.2907	....
6	6.625	8	.12500	6.50597	.958	1.5125	.250	1.9467	6.43047	6.44609	6.3461	....
8	8.625	8	.12500	8.50003	1.063	1.7125	.250	2.1467	8.41797	8.43359	8.3336	....
10	10.750	8	.12500	10.62094	1.210	1.9250	.250	2.4587	10.52969	10.54531	10.4453	....
12	12.750	8	.12500	12.61781	1.360	2.1250	.250	2.5587	12.51719	12.53281	12.3428	....

* Methods of inspection vary. Care should be taken to use a tap drill or taper reamer which can meet thread specifications. Sizes given permit direct tapping without reaming the hole, but only give a full thread for the first two or three threads. See columns K_0 and L_3.

** A.P.I. line pipe. This is the only size line pipe that differs in length from the American Standard. Shown for reference only.

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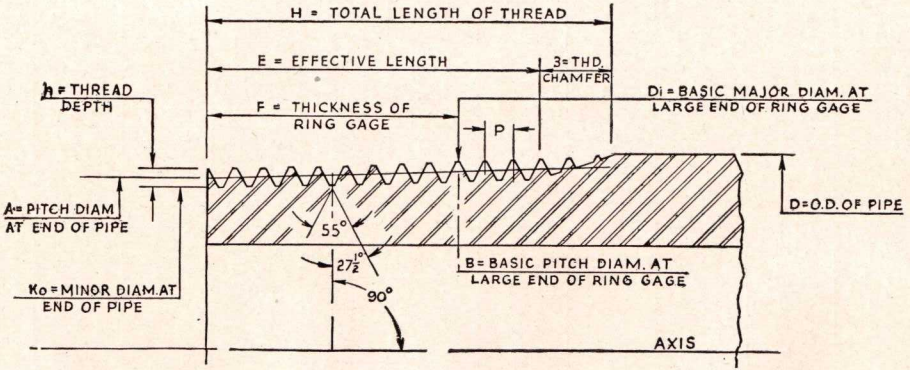
TABLE 358

Basic Thread Dimensions and Tap Drill Sizes
British Standard Pipe Thread

Whitworth Form (American Tap Manufacturers' Practice)


H = TOTAL LENGTH OF THREAD
E = EFFECTIVE LENGTH
3=THD. CHAMFER
h = THREAD DEPTH
F = THICKNESS OF RING GAGE
P
Di = BASIC MAJOR DIAM. AT LARGE END OF RING GAGE
A = PITCH DIAM. AT END OF PIPE
55°
D=O.D. OF PIPE
27½°
B = BASIC PITCH DIAM. AT LARGE END OF RING GAGE
Ko = MINOR DIAM. AT END OF PIPE
90°
AXIS

Formula
- N = number of threads per inch
  $\frac{3}{4}$" taper per foot on diameter
- P = pitch
  Depth of pipe thread = .640327 P.

Note — A change in length of chamfer changes "H."

(See Table on following page)

S. W. CARD MFG. CO.
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TABLE 358

Basic Thread Dimensions and Tap Drill Sizes
British Standard Pipe Thread

Whitworth Form (American Tap Manufacturers' Practice)

(Concluded)

Pipe Size Nominal—Inches	Threads per Inch	Outside Diameter of Pipe (Mean)—Inches	Pitch Inches	Depth of Thread .64032 P—Inches	Basic Major Diam. at Large End of Ring Gage—Inches	Basic Pitch Diam. at Large End of Ring Gage—Inches	Pitch Diam. at End of Pipe—Inches	Minor Diam. at End of Pipe—Inches	Thickness of Ring Gage = Normal Engagement by Hand—Inches	Effective Length of Thread (Basic)—Inches	Total Length of Thread —Inches	Plus or Minus Tolerance on Length of Engagement		Tap Drill Sizes—Inches
												External Thread—Inches	Internal Thread—Inches	
	N	D	P	h	D^1	B	A	Ko	F	E	H			
1/8	28	.400	.03571	.0229	.383	.3601	.3503	.3274	.1563	.2545	.362	.0357	.0446	21/64
1/4	19	.538	.05263	.0337	.518	.4843	.4695	.4358	.2367	.3814	.539	.0526	.0658	29/64
3/8	19	.676	.05263	.0337	.656	.6223	.6067	.5730	.2500	.3947	.553	.0526	.0658	37/64
1/2	14	.847	.07143	.0457	.825	.7793	.7592	.7135	.3214	.5178	.732	.0714	.0893	23/32
3/4	14	1.063	.07143	.0457	1.041	.9953	.9719	.9262	.3750	.5714	.786	.0714	.0893	59/64
1	11	1.336	.09091	.0582	1.309	1.2508	1.2253	1.1671	.4091	.6591	.932	.0909	.1136	1 11/64
1 1/4	11	1.677	.09091	.0582	1.650	1.5918	1.5605	1.5023	.5000	.7500	1.023	.0909	.1136	1 1/2
1 1/2	11	1.909	.09091	.0582	1.882	1.8238	1.7925	1.7343	.5000	.7500	1.023	.0909	.1136	1 3/4
2	11	2.381	.09091	.0582	2.347	2.2888	2.2497	2.1915	.6250	.9204	1.193	.0909	.1136	2 7/32
2 1/2	11	2.996	.09091	.0582	2.960	2.9018	2.8588	2.8006	.6875	1.0511	1.324	.1364	.1364	2 13/16
3	11	3.499	.09091	.0582	3.460	3.4018	3.3510	3.2928	.8125	1.1761	1.449	.1364	.1364	3 5/16
3 1/2	11	3.991	.09091	.0582	3.950	3.8918	3.8371	3.7789	.8740	1.2386	1.511	.1364	.1364	3 13/16
4	11	4.494	.09091	.0582	4.450	4.3918	4.3293	4.2711	1.0000	1.4091	1.682	.1364	.1364	...
5	11	5.498	.09091	.0582	5.450	5.3918	5.3215	5.2633	1.1250	1.5795	1.852	.1364	.1364	...
6	11	6.501	.09091	.0582	6.450	6.3918	6.3215	6.2633	1.1250	1.5795	1.852	.1364	.1364	...
7	10	7.519	.10000	.0640	7.450	7.3860	7.3001	7.2361	1.3750	1.9250	2.225	.2000	.2000	...
8	10	8.524	.10000	.0640	8.450	8.3860	8.2922	8.2282	1.5000	2.0500	2.350	.2000	.2000	...
9	10	9.529	.10000	.0640	9.450	9.3860	9.2922	9.2282	1.5000	2.0500	2.350	.2000	.2000	...
10	10	10.534	.10000	.0640	10.450	10.3860	10.2844	10.2204	1.6250	2.1750	2.475	.2000	.2000	...
11	8	11.540	.12500	.0800	11.450	11.3700	11.2684	11.1884	1.6250	2.3125	2.688	.2500	.2500	...
12	8	12.545	.12500	.0800	12.450	12.3700	12.2684	12.1884	1.6250	2.3125	2.688	.2500	.2500	...

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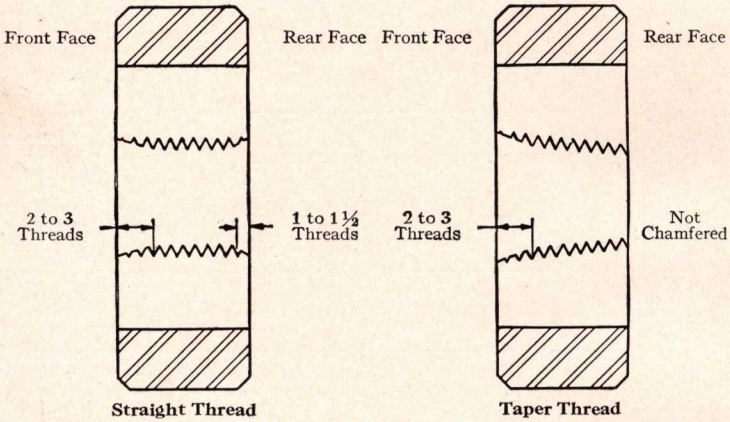
TABLE 360

Dies

Standard Chamfer

Regular dies as listed in this catalog will be chamfered approximately as shown in table below.

When dies are specified with a chamfer varying from that shown in the table, they will be considered special.



Type of Die	Approximate Number of Threads Chamfer	
	Front Face	Rear Face
Spring Screw Threading	2 to 3	.....
Solid Square Bolt	2 to 3	1 to 1½
Solid Square Pipe	2 to 3	0
Adjustable Round Split, Straight Thread	2 to 3	1 to 1½
Adjustable Round Split, Taper Thread	2 to 3	0
Hexagon Rethreading	1	1

TABLE 370

Constants for Finding Pitch Diameter and Minor Diameter of Screw Threads

To find the pitch diameter or minor diameter of any screw thread, subtract the constant for the number of threads per inch from the outside diameter.

Threads per Inch	Constants for Finding Pitch Diameter			Constants for Finding Minor Diameter		
	National Thread	Whitworth Thread	Theoretical V	National Thread	Whitworth Thread	Theoretical V
80	.00812	.00800	.01083	.01624	.01601	.02165
72	.00902	.00889	.01203	.01804	.01786	.02406
64	.01015	.01000	.01353	.02030	.02001	.02706
60	.01083	.01067	.01443	.02165	.02134	.02887
56	.01160	.01144	.01546	.02320	.02286	.03093
50	.01299	.01281	.01732	.02598	.02562	.03464
48	.01353	.01334	.01804	.02706	.02668	.03608
44	.01476	.01455	.01968	.02952	.02910	.03936
40	.01624	.01601	.02165	.03248	.03202	.04330
36	.01804	.01779	.02406	.03608	.03558	.04811
32	.02030	.02001	.02706	.04059	.04002	.05413
30	.02165	.02134	.02887	.04330	.04268	.05773
28	.02320	.02287	.03093	.04639	.04574	.06186
27	.02406	.02372	.03208	.04812	.04742	.06416
26	.02498	.02463	.03331	.04996	.04926	.06662
24	.02706	.02668	.03608	.05413	.05336	.07217
22	.02952	.02911	.03936	.05905	.05821	.07873
20	.03248	.03202	.04330	.06495	.06403	.08660
18	.03608	.03557	.04811	.07217	.07114	.09623
16	.04059	.04002	.05413	.08119	.08004	.10825
14	.04639	.04574	.06186	.09279	.09147	.12372
13	.04996	.04926	.06662	.09993	.09851	.13323
12	.05413	.05336	.07217	.10825	.10672	.14434
11½	.05648	.05568	.07531	.11296	.11132	.15062
11	.05905	.05821	.07873	.11809	.11642	.15746
10	.06495	.06403	.08660	.12990	.12806	.17321
9	.07217	.07115	.09623	.14434	.14230	.19245
8	.08119	.08004	.10825	.16238	.16008	.21651
7	.09279	.09148	.12372	.18558	.18295	.24744
6	.10825	.10672	.14434	.21651	.21344	.28868
5½	.11809	.11642	.15746	.23619	.23284	.31492
5	.12990	.12807	.17321	.25981	.25613	.34641
4½	.14434	.14230	.19245	.28868	.28458	.38490
4	.16238	.16008	.21651	.32476	.32017	.43301
3½	.18558	.18295	.24744	.37115	.36590	.49487
3¼	.19985	.19702	.26647	.39970	.39404	.53294
3	.21651	.21344	.28868	.43301	.42689	.57733

TABLE 380

Tap and Die Terms

Allowance—An intentional difference in the dimensions of mating parts. It is the minimum clearance or the maximum interference which is intended between mating parts. (See LIMITS and TOLERANCE.)

Angle of Thread—The angle included between the sides of the thread, measured in an axial plane.

Axis of Screw—The longitudinal central line through the screw from which all corresponding parts are equally distant.

Back Taper—A slight relief on the thread of the tap axially, which makes the pitch diameter of the thread near the shank somewhat smaller than that at the chamfer. (See RELIEF.)

Base of Thread—The bottom section of a thread; the greatest section between the two adjacent roots.

Basic—The theoretical or nominal standard size from which all variations are made.

Chamfer—The tapering of the end of the thread on a tap or die by cutting away the crest of the first few teeth to distribute the cutting action over several teeth. It also acts as a guide in starting the tap or die.

Crest—The top surface joining the two sides of a thread. The crest of an external thread is at its major diameter, while the crest of an internal thread is at the minor diameter.

Crest Clearance—Defined on a screw form as the space between the crest of a thread and the root of its component.

Depth of Thread—The depth of thread, in profile, is the distance between the crest and the base of thread measured normal to the axis.

Flute—That portion cut away between the lands.

Helix Angle-Flute—The flutes of taps are sometimes cut helically instead of straight, to either pull the chips out of the hole or to bridge a gap such as a keyway. This helix angle is the angle made by the flute with the axis of the tap.

Helix Angle-Thread—The angle made by the helix of a thread at the pitch diameter with a plane perpendicular to the axis.

Interrupted Thread—Applied to taps with every other tooth removed, generally to taps with an odd number of lands so that every other tooth along the helix is removed. This eliminates friction and causes thicker chips per tooth to be taken and is sometimes used for relatively large taps in tough metals.

(Continued on following page)

TABLE 380

Tap and Die Terms

(Continued)

Land—That portion of a thread not cut away by the flutes in taps or the clearance holes in dies.

Lead—The distance a screw thread advances axially in one turn. On a single thread screw the lead and pitch are identical. On a double thread screw the lead is twice the pitch; on a triple thread screw the lead is three times the pitch, etc.

Length of Engagement—The length of contact between two mating parts measured axially.

Limits—The extreme dimensions which are prescribed to provide variations in fit and workmanship. (See ALLOWANCE and TOLERANCE.)

Major Diameter—Commonly known as outside diameter. On a straight tap or die the major diameter is the largest diameter of the thread on the tap or die. The term "major diameter" replaces the term "outside diameter" as applied to the thread of a tap and also the term "full diameter" as applied to the thread of a die.

Minor Diameter—Commonly known as core or root diameter. On a straight tap or die the minor diameter is the smallest diameter of the thread on the tap or die. The term "minor diameter" replaces the term "core diameter" and "root diameter" as applied to the thread of a tap and also the term "inside diameter" as applied to the thread of a die.

Number of Threads—The number of threads in one inch of length.

Pitch—The distance from a point on a screw thread to a corresponding point on the next thread measured parallel to the axis. The pitch equals one divided by the number of threads per inch.

Pitch Diameter—On a straight screw thread the pitch diameter is the diameter of an imaginary cylinder which would pass through the threads at such points as to make the width of the thread and the width of the spaces between the threads at these points equal.

Rake—Any deviation of the cutting face of the tooth from radial. Positive rake or hook is when the extreme point of the cutting face is radially advanced ahead of the balance of the cutting face of the tooth. Negative rake is when the same point is radially behind the balance of the cutting face of the tooth.

Relief—The condition whereby metal is removed from behind the cutting edge to produce clearance and reduce friction. Taps and dies should have the chamfer relieved and may or may not have relief in the angle and on the major diameter of the threads. (See BACK TAPER.)

(Concluded on following page)

TABLE 380

Tap and Die Terms

(Concluded)

Root—The bottom surface joining the sides of two adjacent threads, the root of an external thread is at its minor diameter, while the root of an internal thread is at its major diameter.

Screw Thread—A ridge of uniform section of some desired profile generated in the form of a helix on the inside or outside of a cylinder or cone.

Side of Thread—The surface of the thread which connects the crest with the root.

Thread, Single—A thread in which the lead is equal to the pitch.

Thread, Double—A thread in which the lead is equal to twice the pitch.

Thread, Triple—A thread in which the lead is equal to three times the pitch.

Thread, Quadruple—A thread in which the lead is equal to four times the pitch.

Thread, Drunken—A thread in which the advance of the helix is irregular.

Thread-V—A form of thread having 60 degree angle and sharp crest and root. Impossible in practice and always more or less modified by slight truncations to suit individual conditions.

Tolerance—The amount of variation permitted a manufacturer in producing a tap or die to given specifications. Tolerance may be expressed as plus or minus, or both. A total tolerance is the sum of a plus and minus tolerance. Complete tolerances on threads include those for major diameter, minor diameter, pitch diameter, lead error, error in half angle, error in full angle and finish required. (See ALLOWANCE and LIMITS.)

TABLE 400

Comparative Chart

of Limiting Pitch Diameters for Gages

National Screw Thread Commission Standard

Fractional Sizes

NOTE:—Limits shown in each column represent "Go" and "Not Go" gage sizes.

	SCREWS (RING THREAD GAGES)					NUTS (PLUG THREAD GAGES)			
Size	Loose Fit Class 1	Free Fit Class 2	Medium Fit Class 3	Close Fit Class 4	Basic P. D.	Loose Fit Class 1	Free Fit Class 2	Medium Fit Class 3	Close Fit Class 4
3/8–24	.3466 .3420	.3479 .3446	.3479 .3455	.3482 .3470	.3479	.3525 .3479	.3512 .3479	.3503 .3479	.3491 .3479
3/8–16	.3326 .3263	.3344 .3299	.3344 .3312	.3348 .3332	.3344	.3407 .3344	.3389 .3344	.3376 .3344	.3360 .3344
7/16–20	.4035 .3984	.4050 .4014	.4050 .4024	.4053 .4040	.4050	.4101 .4050	.4086 .4050	.4076 .4050	.4063 .4050
7/16–14	.3890 .3820	.3911 .3862	.3911 .3875	.3915 .3897	.3911	.3981 .3911	.3960 .3911	.3947 .3911	.3929 .3911
1/2–20	.4660 .4609	.4675 .4639	.4675 .4649	.4678 .4665	.4675	.4726 .4675	.4711 .4675	.4701 .4675	.4688 .4675
1/2–13	.4478 .4404	.4500 .4448	.4500 .4463	.4504 .4485	.4500	.4574 .4500	.4552 .4500	.4537 .4500	.4519 .4500
9/16–18	.5248 .5191	.5264 .5223	.5264 .5234	.5267 .5252	.5264	.5321 .5264	.5305 .5264	.5294 .5264	.5279 .5264
9/16–12	.5060 .4981	.5084 .5028	.5084 .5044	.5089 .5069	.5084	.5163 .5084	.5140 .5084	.5124 .5084	.5104 .5084
5/8–18	.5873 .5816	.5889 .5848	.5889 .5859	.5892 .5877	.5889	.5946 .5889	.5930 .5889	.5919 .5889	.5904 .5889
5/8–11	.5634 .5549	.5660 .5601	.5660 .5618	.5665 .5644	.5660	.5745 .5660	.5719 .5660	.5702 .5660	.5681 .5660
3/4–16	.7076 .7013	.7094 .7049	.7094 .7062	.7098 .7082	.7094	.7157 .7094	.7139 .7094	.7126 .7094	.7110 .7094
3/4–10	.6822 .6730	.6850 .6786	.6850 .6805	.6856 .6833	.6850	.6942 .6850	.6914 .6850	.6895 .6850	.6873 .6850
7/8–14	.8265 .8195	.8286 .8237	.8286 .8250	.8290 .8272	.8286	.8356 .8286	.8335 .8286	.8322 .8286	.8304 .8286
7/8– 9	.7997 .7897	.8028 .7958	.8028 .7979	.8034 .8010	.8028	.8128 .8028	.8098 .8028	.8077 .8028	.8052 .8028
1 –14	.9515 .9445	.9536 .9487	.9536 .9500	.9540 .9522	.9536	.9606 .9536	.9585 .9536	.9572 .9536	.9554 .9536
1 – 8	.9154 .9043	.9188 .9112	.9188 .9134	.9195 .9168	.9188	.9299 .9188	.9264 .9188	.9242 .9188	.9215 .9188
1 1/8–12	1.0685 1.0606	1.0709 1.0653	1.0709 1.0669	1.0714 1.0694	1.0709	1.0788 1.0709	1.0765 1.0709	1.0749 1.0709	1.0729 1.0709
1 1/8– 7	1.0283 1.0159	1.0322 1.0237	1.0322 1.0263	1.0330 1.0300	1.0322	1.0446 1.0322	1.0407 1.0322	1.0381 1.0322	1.0352 1.0322
1 1/4–12	1.1935 1.1856	1.1959 1.1903	1.1959 1.1919	1.1964 1.1944	1.1959	1.2038 1.1959	1.2015 1.1959	1.1999 1.1959	1.1979 1.1959
1 1/4– 7	1.1533 1.1409	1.1572 1.1487	1.1572 1.1513	1.1580 1.1550	1.1572	1.1696 1.1572	1.1657 1.1572	1.1631 1.1572	1.1602 1.1572
1 1/2–12	1.4435 1.4356	1.4459 1.4403	1.4459 1.4419	1.4464 1.4444	1.4459	1.4538 1.4459	1.4515 1.4459	1.4499 1.4459	1.4479 1.4459
1 1/2– 6	1.3873 1.3728	1.3917 1.3816	1.3917 1.3846	1.3926 1.3890	1.3917	1.4062 1.3917	1.4018 1.3917	1.3988 1.3917	1.3953 1.3917

TABLE 400

Comparative Chart

of Limiting Pitch Diameters for Gages

National Screw Thread Commission Standard

Machine Screw and Fractional Sizes

NOTE:—Limits shown in each column represent "Go" and "Not Go" sizes.

SCREWS (RING THREAD GAGES)					NUTS (PLUG THREAD GAGES)				
Size	Loose Fit Class 1	Free Fit Class 2	Medium Fit Class 3	Close Fit Class 4	Basic P. D.	Loose Fit Class 1	Free Fit Class 2	Medium Fit Class 3	Close Fit Class 4
0–80	.0512 .0488	.0519 .0502	.0519 .0506	.0520 .0514	.0519	.0543 .0519	.0536 .0519	.0532 .0519	.0525 .0519
1–72	.0633 .0608	.0640 .0622	.0640 .0627	.0641 .0634	.0640	.0665 .0640	.0658 .0640	.0653 .0640	.0647 .0640
1–64	.0622 .0596	.0629 .0610	.0629 .0615	.0630 .0623	.0629	.0655 .0629	.0648 .0629	.0643 .0629	.0636 .0629
2–64	.0752 .0726	.0759 .0740	.0759 .0745	.0760 .0753	.0759	.0785 .0759	.0778 .0759	.0773 .0759	.0766 .0759
2–56	.0736 .0708	.0744 .0724	.0744 .0729	.0746 .0739	.0744	.0772 .0744	.0764 .0744	.0759 .0744	.0751 .0744
3–56	.0866 .0838	.0874 .0854	.0874 .0859	.0876 .0869	.0874	.0902 .0874	.0894 .0874	.0889 .0874	.0881 .0874
3–48	.0846 .0815	.0855 .0833	.0855 .0839	.0857 .0849	.0855	.0886 .0855	.0877 .0855	.0871 .0855	.0863 .0855
4–48	.0976 .0945	.0985 .0963	.0985 .0969	.0987 .0979	.0985	.1016 .0985	.1007 .0985	.1001 .0985	.0993 .0985
4–40	.0948 .0914	.0958 .0934	.0958 .0941	.0960 .0951	.0958	.0992 .0958	.0982 .0958	.0975 .0958	.0967 .0958
5–44	.1093 .1061	.1102 .1079	.1102 .1086	.1104 .1096	.1102	.1134 .1102	.1125 .1102	.1118 .1102	.1110 .1102
5–40	.1078 .1044	.1088 .1064	.1088 .1071	.1090 .1081	.1088	.1122 .1088	.1112 .1088	.1105 .1088	.1097 .1088
6–40	.1208 .1174	.1218 .1194	.1218 .1201	.1220 .1211	.1218	.1252 .1218	.1242 .1218	.1235 .1218	.1227 .1218
6–32	.1166 .1128	.1177 .1150	.1177 .1158	.1179 .1169	.1177	.1215 .1177	.1204 .1177	.1196 .1177	.1187 .1177
8–36	.1449 .1413	.1460 .1435	.1460 .1442	.1462 .1453	.1460	.1496 .1460	.1485 .1460	.1478 .1460	.1469 .1460
8–32	.1426 .1388	.1437 .1410	.1437 .1418	.1439 .1429	.1437	.1475 .1437	.1464 .1437	.1456 .1437	.1447 .1437
10–32	.1686 .1648	.1697 .1670	.1697 .1678	.1699 .1689	.1697	.1735 .1697	.1724 .1697	.1716 .1697	.1707 .1697
10–24	.1616 .1570	.1629 .1596	.1629 .1605	.1632 .1620	.1629	.1675 .1629	.1662 .1629	.1653 .1629	.1641 .1629
12–28	.1916 .1873	.1928 .1897	.1928 .1906	.1930 .1919	.1928	.1971 .1928	.1959 .1928	.1950 .1928	.1939 .1928
12–24	.1876 .1830	.1889 .1856	.1889 .1865	.1892 .1880	.1889	.1935 .1889	.1922 .1889	.1913 .1889	.1901 .1889
1/4–28	.2256 .2213	.2268 .2237	.2268 .2246	.2270 .2259	.2268	.2311 .2268	.2299 .2268	.2290 .2268	.2279 .2268
1/4–20	.2160 .2109	.2175 .2139	.2175 .2149	.2178 .2165	.2175	.2226 .2175	.2211 .2175	.2201 .2175	.2188 .2175
5/16–24	.2841 .2795	.2854 .2821	.2854 .2830	.2857 .2845	.2854	.2900 .2854	.2887 .2854	.2878 .2854	.2866 .2854
5/16–18	.2748 .2691	.2764 .2723	.2764 .2734	.2767 .2752	.2764	.2821 .2764	.2805 .2764	.2794 .2764	.2779 .2764

TABLE 401

Of Decimals

Equalling Parts of an Inch

1/64	.0156
1/32	.0313
3/64	.0469
1–16	.0625
5/64	.0781
3/32	.0938
7/64	.1094
1–8	.1250
9/64	.1406
5/32	.1563
11/64	.1719
3–16	.1875
13/64	.2031
7/32	.2188
15/64	.2344
1–4	.2500
17/64	.2656
9/32	.2813
19/64	.2969
5–16	.3125
21/64	.3281
11/32	.3438
23/64	.3594
3–8	.3750
25/64	.3906
13/32	.4063
27/64	.4219
7–16	.4375
29/64	.4531
15/32	.4688
31/64	.4844
1–2	.5000
33/64	.5156
17/32	.5313
35/64	.5469
9–16	.5625
37/64	.5781
19/32	.5938
39/64	.6094
5–8	.6250
41/64	.6406
21/32	.6563
43/64	.6719
11–16	.6875
45/64	.7031
23/32	.7188
47/64	.7344
3–4	.7500
49/64	.7656
25/32	.7813
51/64	.7969
13–16	.8125
53/64	.8281
27/32	.8438
55/64	.8594
7–8	.8750
57/64	.8906
29/32	.9063
59/64	.9219
15–16	.9375
61/64	.9531
31/32	.9688
63/64	.9844
1	1.

TABLE 402

Weight per Inch

Of round bars of carbon and high speed steel in pounds per linear inch.

Diam. of Bar Inches	Weight of Bar One Inch Long		Diam. of Bar Inches	Weight of Bar One Inch Long		Diam. of Bar Inches	Weight of Bar One Inch Long	
	Carbon Steel	High Speed Steel		Carbon Steel	High Speed Steel		Carbon Steel	High Speed Steel
1/16	.00087	.00098	2 7/16	1.33	1.496	4 13/16	5.15	5.793
1/8	.0035	.0039	2 1/2	1.39	1.563	4 7/8	5.28	5.940
3/16	.0078	.0088	2 9/16	1.46	1.642	4 15/16	5.42	6.097
1/4	.0139	.0156	2 5/8	1.53	1.721	5	5.56	6.255
5/16	.0217	.0244	2 11/16	1.61	1.811	5 1/16	5.70	6.412
3/8	.0313	.0352	2 3/4	1.68	1.890	5 1/8	5.84	6.570
7/16	.0425	.0478	2 13/16	1.76	1.980	5 3/16	5.98	6.727
1/2	.0556	.0625	2 7/8	1.84	2.070	5 1/4	6.13	6.896
9/16	.0703	.0791	2 15/16	1.92	2.160	5 5/16	6.27	7.053
5/8	.0868	.0976	3	2.00	2.250	5 3/8	6.42	7.222
11/16	.105	.118	3 1/16	2.08	2.340	5 7/16	6.57	7.391
3/4	.125	.141	3 1/8	2.17	2.441	5 1/2	6.72	7.560
13/16	.147	.165	3 3/16	2.26	2.542	5 9/16	6.88	7.740
7/8	.170	.191	3 1/4	2.35	2.643	5 5/8	7.03	7.908
15/16	.195	.219	3 5/16	2.44	2.745	5 11/16	7.19	8.088
1	.22	.248	3 3/8	2.53	2.846	5 3/4	7.35	8.268
1 1/16	.25	.281	3 7/16	2.63	2.958	5 13/16	7.51	8.448
1 1/8	.28	.315	3 1/2	2.72	3.060	5 7/8	7.67	8.628
1 3/16	.31	.349	3 9/16	2.82	3.172	5 15/16	7.84	8.820
1 1/4	.35	.397	3 5/8	2.92	3.285	6	8.00	9.000
1 5/16	.38	.427	3 11/16	3.02	3.397	6 1/8	8.34	9.382
1 3/8	.42	.472	3 3/4	3.13	3.521	6 1/4	8.68	9.765
1 7/16	.46	.517	3 13/16	3.23	3.633	6 3/8	9.03	10.16
1 1/2	.50	.562	3 7/8	3.34	3.757	6 1/2	9.39	10.56
1 9/16	.54	.607	3 15/16	3.45	3.881	6 5/8	9.76	10.98
1 5/8	.59	.663	4	3.56	4.005	6 3/4	10.1	11.36
1 11/16	.63	.709	4 1/16	3.67	4.128	6 7/8	10.5	11.81
1 3/4	.68	.765	4 1/8	3.78	4.252	7	10.9	12.26
1 13/16	.73	.821	4 3/16	3.90	4.387	7 1/8	11.3	12.71
1 7/8	.78	.877	4 1/4	4.01	4.511	7 1/4	11.7	13.16
1 15/16	.83	.933	4 5/16	4.13	4.646	7 3/8	12.1	13.61
2	.89	1.001	4 3/8	4.25	4.781	7 1/2	12.5	14.06
2 1/16	.94	1.057	4 7/16	4.38	4.927	7 5/8	12.9	14.51
2 1/8	1.00	1.125	4 1/2	4.50	5.062	7 3/4	13.3	14.96
2 3/16	1.06	1.192	4 9/16	4.63	5.208	7 7/8	13.8	15.52
2 1/4	1.13	1.271	4 5/8	4.75	5.343	8	14.3	16.08
2 5/16	1.19	1.338	4 11/16	4.88	5.490			
2 3/8	1.25	1.406	4 3/4	5.01	5.636			

TABLE 403

Decimals of Millimeters and Equivalent Decimals of Inches

(Advancing by .01mm.)

mm.	Inches	mm.	Inches	mm.	Inches	mm.	Inches
.01	.00039	.26	.01024	.51	.02008	.76	.02992
.02	.00079	.27	.01063	.52	.02047	.77	.03032
.03	.00118	.28	.01102	.53	.02087	.78	.03071
.04	.00157	.29	.01142	.54	.02126	.79	.03110
.05	.00197	.30	.01181	.55	.02165	.80	.03150
.06	.00236	.31	.01220	.56	.02205	.81	.03189
.07	.00276	.32	.01260	.57	.02244	.82	.03228
.08	.00315	.33	.01299	.58	.02283	.83	.03268
.09	.00354	.34	.01339	.59	.02323	.84	.03307
.10	.00394	.35	.01378	.60	.02362	.85	.03346
.11	.00433	.36	.01417	.61	.02402	.86	.03386
.12	.00472	.37	.01457	.62	.02441	.87	.03425
.13	.00512	.38	.01496	.63	.02480	.88	.03465
.14	.00551	.39	.01535	.64	.02520	.89	.03504
.15	.00591	.40	.01575	.65	.02559	.90	.03543
.16	.00630	.41	.01614	.66	.02598	.91	.03583
.17	.00669	.42	.01654	.67	.02638	.92	.03622
.18	.00709	.43	.01693	.68	.02677	.93	.03661
.19	.00748	.44	.01732	.69	.02717	.94	.03701
.20	.00787	.45	.01772	.70	.02756	.95	.03740
.21	.00827	.46	.01811	.71	.02795	.96	.03780
.22	.00866	.47	.01850	.72	.02835	.97	.03819
.23	.00906	.48	.01890	.73	.02874	.98	.03858
.24	.00945	.49	.01929	.74	.02913	.99	.03898
.25	.00984	.50	.01969	.75	.02953	1.00	.03937

TABLE 404

Equivalents of Millimeters in Decimals of Inches

(Advancing by 1mm.)

mm.	Inches	mm.	Inches	mm.	Inches	mm.	Inches
1	.03937	26	1.02362	51	2.00787	76	2.99212
2	.07874	27	1.06299	52	2.04724	77	3.03149
3	.11811	28	1.10236	53	2.08661	78	3.07086
4	.15748	29	1.14173	54	2.12598	79	3.11023
5	.19685	30	1.18110	55	2.16535	80	3.14960
6	.23622	31	1.22047	56	2.20472	81	3.18897
7	.27559	32	1.25984	57	2 24409	82	3.22834
8	.31496	33	1.29921	58	2.28346	83	3.26771
9	.35433	34	1.33858	59	2.32283	84	3.30708
10	.39370	35	1.37795	60	2.36220	85	3.34645
11	.43307	36	1.41732	61	2.40157	86	3.38582
12	.47244	37	1.45669	62	2.44094	87	3.42519
13	.51181	38	1.49606	63	2.48031	88	3.46456
14	.55118	39	1.53543	64	2.51968	89	3.50393
15	.59055	40	1.57480	65	2.55905	90	3.54330
16	.62992	41	1.61417	66	2.59842	91	3.58267
17	.66929	42	1.65354	67	2.63779	92	3.62204
18	.70866	43	1.69291	68	2.67716	93	3.66141
19	.74803	44	1.73228	69	2.71653	94	3.70078
20	.78740	45	1.77165	70	2.75590	95	3.74015
21	.82677	46	1.81102	71	2.79527	96	3.77952
22	.86614	47	1.85039	72	2.83464	97	3.81889
23	.90551	48	1.88976	73	2.87401	98	3.85826
24	.94488	49	1.92913	74	2.91338	99	3.89763
25	.98425	50	1.96850	75	2.95275	100	3.93700

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